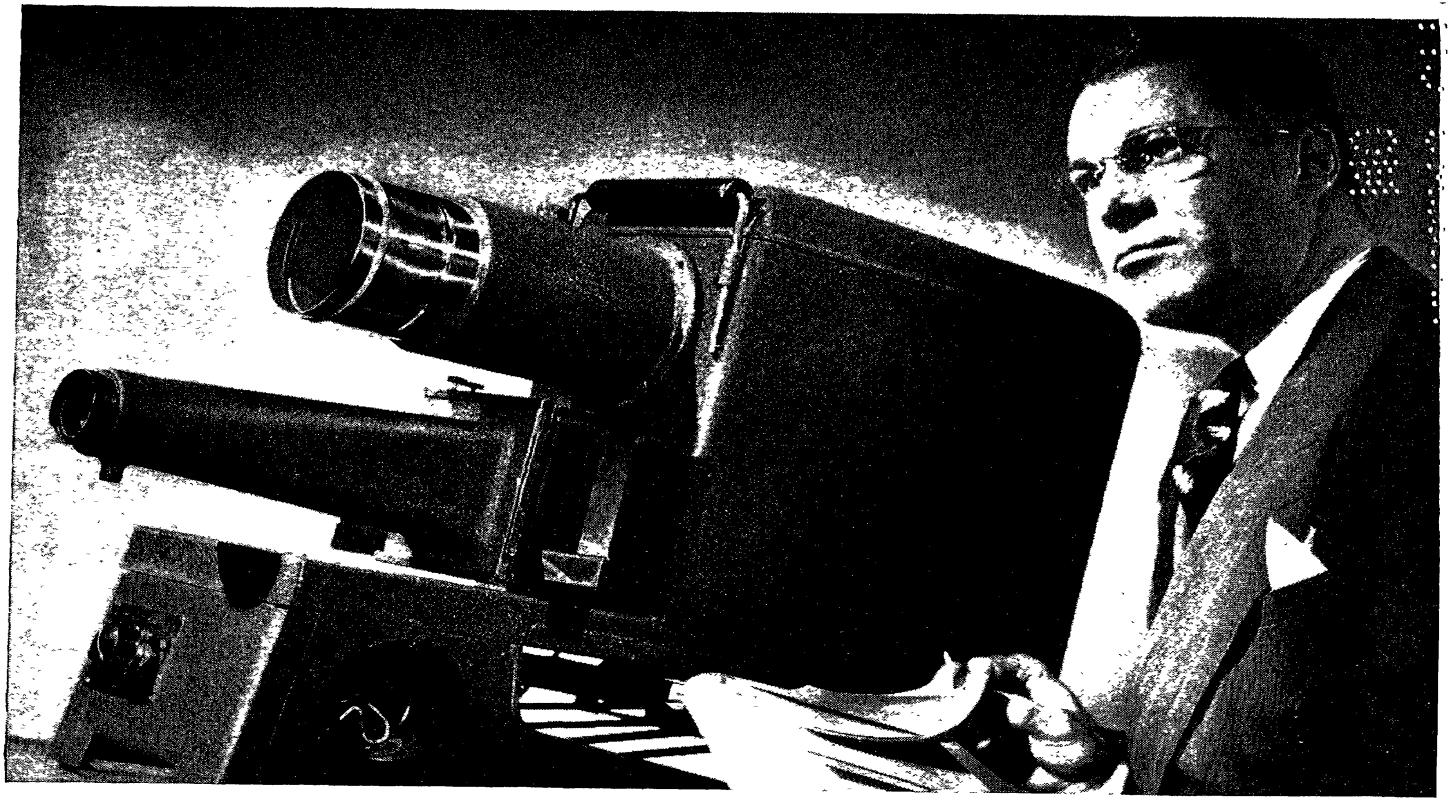
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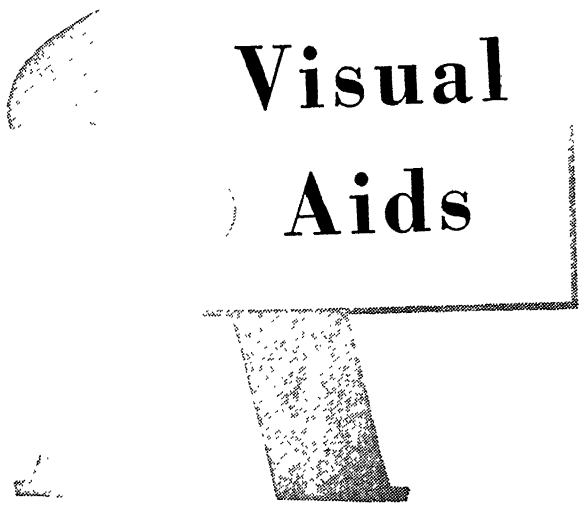
PREPARATION AND USE OF Visual Aids



Courtesy of Bausch and Lomb Optical Co.

COMBINING THE TEXT BOOK AND THE OPAQUE PROJECTOR FOR FOCUSED ATTENTION, AROUSED INTEREST, AND CONTROLLED LEARNING.

PREPARATION AND USE OF



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Preface

THIS book is designed as a basic or supplementary text suitable as a course in the technique and methods used in the preparation and use of visual aids. In addition to instructor and teacher training courses, it is well adapted to merchandising, advertising, and sales promotion. It should be especially useful in industrial training programs.

Each chapter includes a brief, practical presentation of a visual aid and how to use it effectively. The book details how to use, how to prepare, and where to find these aids.

This text was prepared to meet the needs of a large number of people who can use visual aids in education and training; in all sorts of courses; in all levels of instruction; in industrial, business, social, church, and other activities where visual aids are effective in improving the performance and the presentation of the subject matter. The book is especially helpful to those engaged in related activities, such as advertising, photography, training, newspapers, national and trade associations, YMCA groups, boy scouts, and many committee and group activities.

The need for more effective instructional methods as well as the value of visual aids in personnel training, merchandising, and educational processes has been widely recognized. Visual aids are now universally used in combination with skillful instructors and are being adopted for use by a large and ever growing number of organizations. During the War, the United States Armed Forces found that the use of visual aids resulted in:

1. Gain of approximately 25 to 35 per cent in factional information.

2. An increase of approximately 35 per cent in retention of that information over that attained by the traditional methods of instruction. Even better results are now being reported in the field of merchandising, employee instruction, and job training.

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Introduction

VISUAL aids are essential to efficient instruction. Training films, film strips, blackboard illustrations, photographs, charts, models, and other devices enable an instructor to arouse and hold the attention of trainees in such a manner that learning is accomplished swiftly, efficiently, and thoroughly.

Visual devices are powerful tools in the hands of an efficient instructor. Words, both written and oral, are often inadequate to convey delicate meanings, understandings, and appreciations to the mind of the student. Pictorialization frequently succeeds when words fail. Since more people see alike than hear or read alike, the skillful use of training aids is essential to personnel trainers.

For example, the members of a class in textiles read a description of a certain fabric. The description in itself may be accurate, yet no two employees will retain the same mental pictures by reading the description. However, when the group can see and handle or work with the fabric, or view a motion picture showing the source of the material and how it is produced, their individual mental images will be quite similar and correspond closely with the actual facts the instructor wants to "get across." There are other examples of the advantage visual instruction has over the verbalism that often prevails in training classrooms.

The primary objective of personnel training is to turn out skilled, efficient workers. To develop "doing" skills, training designed to develop these skills must make provision for *showing the trainee how to perform.* The trainee obtains his ideas of how to perform in two ways: first, by watching a personal demonstration by the instructor; and second, by studying illustrations of how the skills are to be performed.

The personal-demonstration method is good if it is always practical or efficient; demonstrations through the medium of visual aids require much less preparation on the part of the instructor. The visual aid has the advantages of reality, animation, timing magnification, slow motion, and flexibility, all of which greatly enhance training procedures.

Skill is required to use training aids efficiently. The personnel trainer must use the right kind of training aid for his particular

subject. The material used must be simple so that the trainee can retain his grasp of the main essentials. He must use up-to-date visual aids at the right time and in the right way.

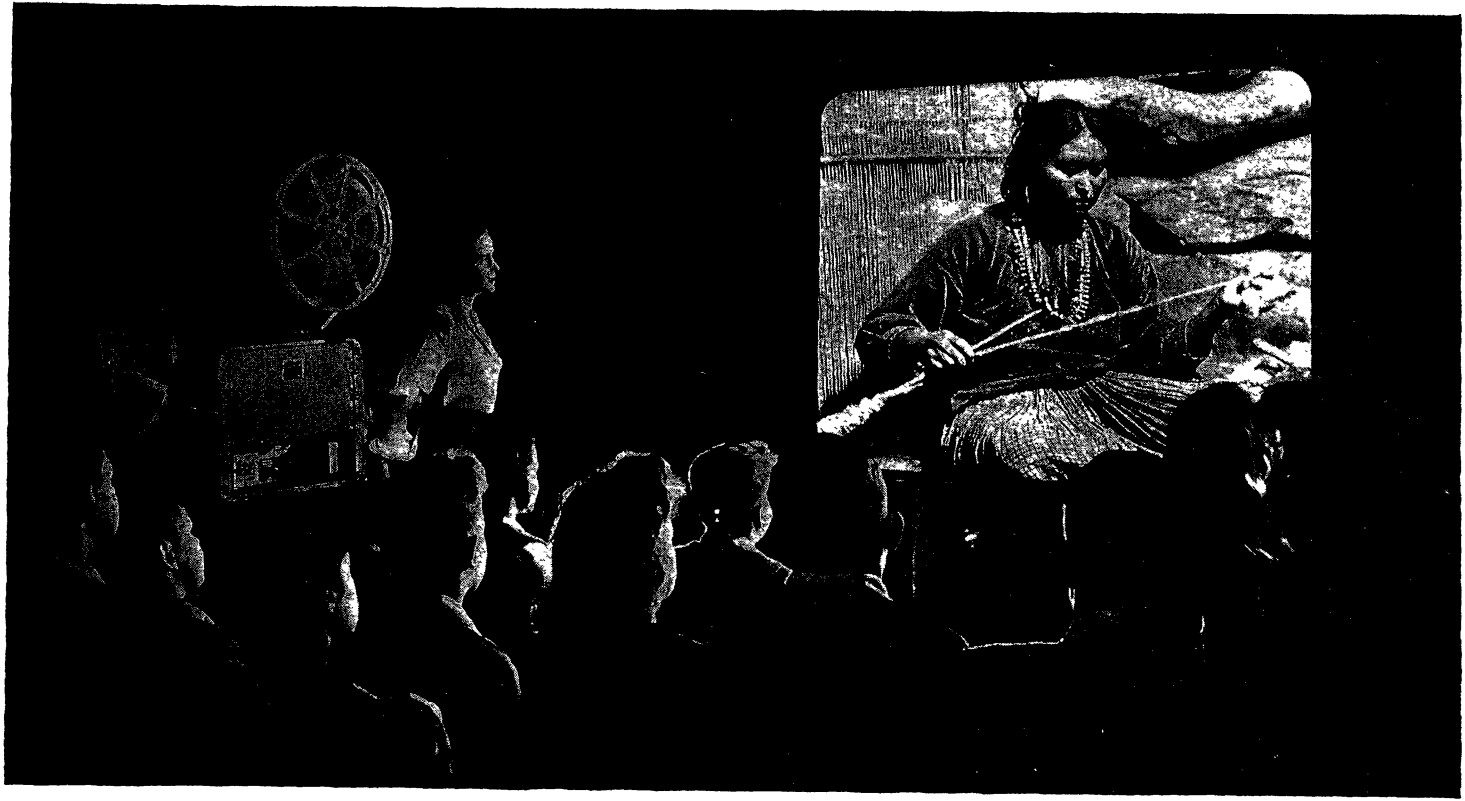
The instructor or personnel trainer regards visual aids as *aids* to good training. Such aids are not intended to displace good textbooks and good instructional techniques used successfully for generations. There is no substitute for personal instruction and follow-up. The use of training aids and devices cannot displace the rich personality and warmth of a competent instructor, nor any devices supplant the guided trainee's application, perspiration, and thinking.

Visual aids combined with good textbooks, and a competent instructor, form an unbeatable combination.

PREPARATION

AND USE OF

Visual Aids



Courtesy of Bell and Howell Co.

USING MOTION PICTURES TO DEVELOP KNOWLEDGE, ATTITUDES, AND SKILLS.



Motion Pictures

"ONE PICTURE is worth 10,000 words" is a time-honored generalization which may or may not be entirely accurate. Nevertheless, skillful use of pictures has resulted in highly successful training, which proves that teaching may be done much more effectively by pictures than by words alone.

A single picture is effective, but pictures presented in sequence have an accumulative effectiveness. When pictures are shown in sequence at the rate of twelve each second, they give the impression of motion or animation in the objects portrayed. If the sequence is arranged in the proper order and used in the correct manner, the pictures pack a terrific punch.

So that the most effective use may be made of motion pictures, certain information and skills must be made a part of the working kit of the individual who uses them for training purposes.

The necessary information and skills should be acquired in the following order of use:

1. Where to obtain appropriate films
2. How to use motion pictures
3. How to operate motion picture projectors
4. How to make a training motion picture
5. Content for a home-made film
6. "Do's" for using motion pictures in training

Where to Obtain Appropriate Films

Probably the most vexing question in the mind of the personnel trainer is "Where can I get appropriate or related training films

for my field?" Any personnel trainer or instructor can have a wealth of training films at his finger tips by securing one of the catalogues listed on pages 2 and 3.



Courtesy of Encyclopaedia Britannica Films, Inc.

SELECTED EXPERIENCES IN THE CLASSROOM WITH MOTION PICTURES

The motion pictures referred to below are 16 mm. films, silent or sound, black-and-white or colored, and may be obtained (1) free, (2) for a small shipping charge, (3) on a nominal rental basis, or (4) by purchasing outright. All necessary information, including the nearest source, is included in the catalogues.

1. *Directories of 16 mm. Motion Picture Film Sources,* Bell & Howell Company, 1801-1815 Larchmont Avenue, Chicago, Ill.
 (*a*) Agriculture Directory, price—25¢
 (*b*) Geography, Travel, and Natural Resources Films, price—25¢
 (*c*) Medical and Dental Catalogue, price—50¢
 (*d*) Religious Film Sources, price—10¢
2. *Directory of Film Sources,* Victor Animatograph, Davenport, Iowa, price—50¢.
3. *General Electric Motion Pictures,* Visual Instruction Section, General Electric Company, Schenectady, N. Y.
4. *General Motors Film Catalogue,* General Motors Corporation, 1775 Broadway, New York, N. Y.
5. *U. S. Government Film Directory,* U. S. Office of Education, Federal Security Agency, Washington, D. C.
6. *U. S. Steel Corporation Subsidiaries Film Catalogue,* U. S. Steel Corporation Subsidiaries, 208 South La Salle Street, Chicago, Ill.
7. *Visual Aids for Retail Training,* Harry Q. Packer, Middlesex County Retail Training Bureau, Woodbridge, N. J., price—$1.00.

8. *Educational Film Catalog,* H. W. Wilson Company, 950 University Avenue, New York, N. Y., price—$2.00.

9. *1,000 and One—The Blue Book of Nontheatrical Films,* Educational Screen, 64 East Lake Street, Chicago, Illinois, price—$1.00.

10. *Educator's Guide to Free Films,* Educational Progress League, Randolph, Wisconsin, price—$3.00.

Subjects Covered in Film Catalogues

The following are only a few of the areas of subject matter covered in the above sources:

Agriculture
Art
Astronomy
Botany
Business
Chemistry
Communications
Dairy
Engineering
Executive Training
Farm Economics
Fine Arts
Fisheries
Foreman Training
Geography
Geology
Guidance
Health
History
Home Economics
Hotels
Industrial Management
Journalism
Languages
Literature
Manufacturing
Marketing
Mathematics
Medicine
Merchandise Information
Military Training
Mining
Nontextiles
Personal Development
Philosophy
Physics
Religion
Retailing
Salesmanship
Science
Secretarial Work
Shorthand
Sociology
Supervision
Teacher Training
Textiles
Transportation
Typewriting
Vocational Training
Zoology

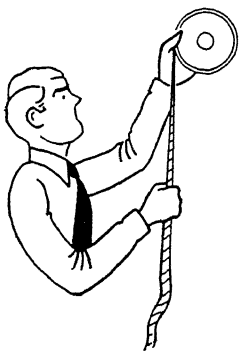
How to Use Motion Pictures

Select proper film. It is unfair to trainees to show a film merely to take up time: each presentation should have a definite training objective, which is usually to explain and clarify a specific job problem. The trainer instructor should check through his training plan, and place the date and title of his film in a visual aid column. Unless he has his own film library, he should order the film well in advance to assure delivery on time.

Check everything before showing film. Last-minute disturbances and hurried preparations do not contribute to an effective

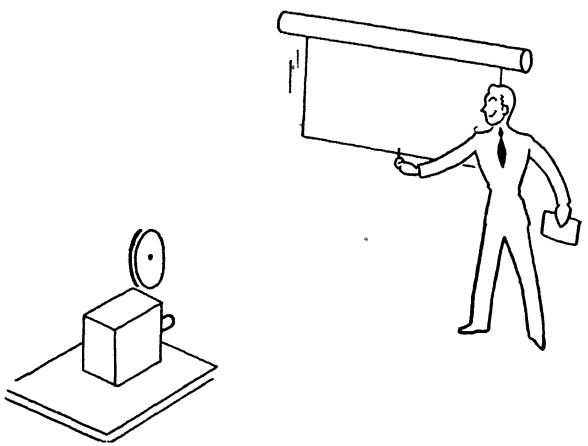
motion picture projection. These distractions can be avoided by checking the following points:

1. *Preview training film.* This is a MUST in order to insure proper handling of a film. For future reference, it is also advisable to note briefly contents of the motion picture on file cards, including title, running time, type, and source. After the initial preview, it will only be necessary to check the file card before showing the film.



The instructor's manual and film guide, which accompany training films, usually give reviews of the content, tests on material, job-instructing technique, and suggestion for special followup problems.

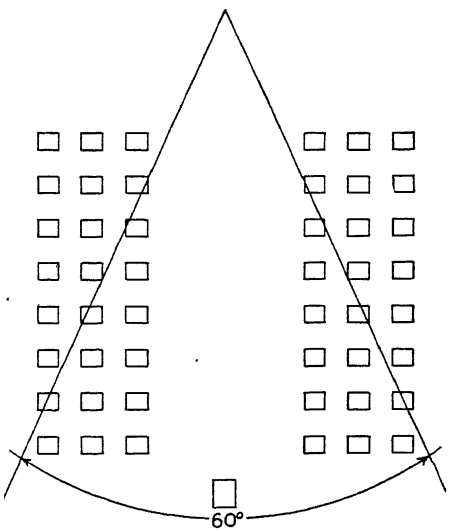
2. *Set up projector and screen.* The projector and screen in a modern training room are either one complete unit or permanent fixtures. In most situations, however, it will be necessary to set up the projector and to focus the light on a screen. The distance between projector and screen will be determined by the number in the training group, type of screen, and shape of the room.



The projector should be placed on a 4-foot stand. If such a stand is not available, a table or any other steady support will serve the purpose. If using a sound film, attach the speaker to the projector and place the speaker up front, near the screen. Best results are obtained if the speaker is kept off the floor, upon a stand or table.

A screen so placed that the bottom is approximately at the eye level of the seated trainees provides the best vision. The portable-stand type has this feature built in the mechanism. However, when using the table- or roller-type, screen, this point should be kept in mind. When a screen is not available, use a large sheet of white paper or light-colored fiber board. An excellent home-made screen can be made by painting a wall or any other smooth surface with three coats of flat, white paint. Flat white reflects a better image than an aluminum-painted surface.

When a projector is used in an extremely large hall or auditorium, it may be necessary to increase the size of the projector lamp, and an auxiliary telescope lens may possibly be required. In most cases, these additions can be avoided by placing the projector close enough to utilize the full space of the screen. To provide a projector support in an auditorium having stationary seats, it will be necessary to build a simple fixture to rest on two seat backs.

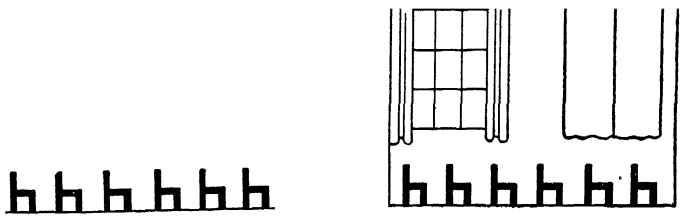


3. *Check seating arrangement.* A motion picture viewed outside of a 60-degree angle becomes distorted — therefore, it is advisable to confine all chairs within this space. If the chairs are permanent, request the trainees not to use seats outside this area. Also avoid using those chairs directly in front of the screen: an area of approximately six feet should be left vacant.

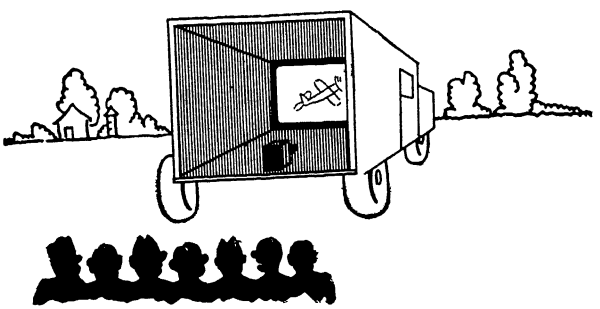
4. *Check lighting.* Unless you are using a single projector-screen unit or a shadow box, it is advisable to darken the room. If the situation requires the trainee to take special notes on the film, use the room lights instead of raising the window shades. Prevent light rays from shining directly on the trainee's face.

If the training room is not equipped with opaque shades, outside light may easily be excluded by using a simple home-made shade of inexpensive canvas or duck material. Opaque drapery material would be adequate, and would add to the attractiveness

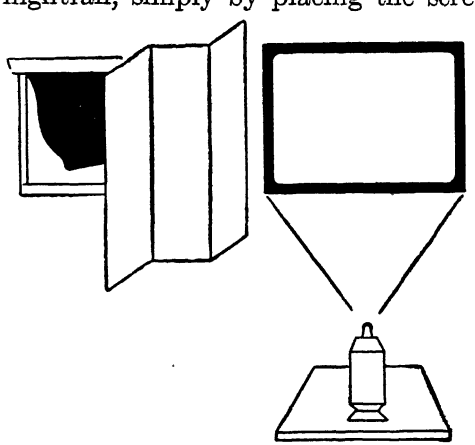
of the room. Windows spaced close together could be covered by drawing a single shade across the entire wall. Windows with large



areas of wall space between them could be adequately darkened by hanging the material on individual curtain rods.



Outdoor meetings, in the plant yard or on a country field, may also utilize a motion picture presentation without waiting for nightfall, simply by placing the screen in a suitable shaded area. The inside of a covered truck would be excellent.



5. *Check ventilation.* A hot, stuffy, dark room induces sleep and drowsiness. Sacrifice complete darkness to avoid poor ventilation. In warm weather, use cardboard "dark room" ventilators, which are inexpensive and may be purchased at most local photography stores.

Room temperature over 72° or humidity above 50 per cent dulls alertness and affects learning adversely. Alleviate this situation with an ordinary electric fan or a small air-conditioning unit.

6. *Test projector.* Know your projector before attempting to use it. Films and projectors are expensive, extremely sensitive, and require special handling. Fumbling with a projector will prevent giving a smooth performance. Therefore, learn how to operate the machine before operating it during the training session.

Check the electric outlet for current when the room lights are turned off.



Insert film in projector and focus the image or title on the screen. Check the image for sharpness and centering. If necessary, rethread the projector and have everything ready so that it is merely necessary to turn off the room lights and start the projector.

The stage is set and the store training meeting is about to begin. Follow your plan.

Presenting the motion picture. An otherwise excellent training film is worthless if it is not presented properly. A good instructor will lay a strong foundation for instruction by arousing the enthusiasm of the trainee and by presenting the film at the right moment. The following procedure will assure success.

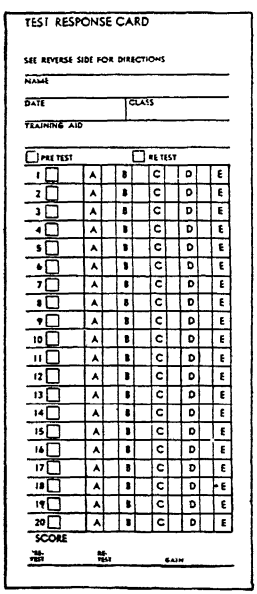
1. *Prepare trainee.* Use the job approach when possible. Put the trainee at ease with a few carefully planned remarks about his job. Then, in a simple clear-cut manner, state the problem that is to be solved. Tell why the film is being shown, and above all, show the trainee how he will benefit by it. If the trainee realizes that his knowledge will be tested at the completion of the job problem, usually his interest will become more acute, his keenness of observation greater, and his ability to learn more effective.

2. *Present film and instruction.* Step by step, call the attention of the trainees to all important points in the film. Present each step briefly, clearly, and in the proper learning sequence. Your presentation should proceed in a direct path from what the trainee knows to what he does not know. Show the key points. Darken the room and project the film. Remember it is not necessary to use an entire training film. Use only that portion that pertains to the specific job problem.

3. *Apply training.* Apply the information immediately to specific problems, or as soon as possible after showing the film. Have

each trainee perform the task and explain each step. In all three categories of store problems—(1) manipulative skill, (2) factual information, and (3) attitude development—insist on appropriate terminology and correct timing.

4. *Test trainees.* Can the trainees perform the job? Can they apply the new information or use the new attitude? This is the only real test for effective training. In other words, "They can or they can't." If the job problem is a manipulative skill, test the trainees for performance and speed. If it is attitude development or factual information, use a simple test or quiz card. The quiz card shown in the illustration is very effective. The instructor reads questions of the objective type: true-false, completion, multiple choice, or matching. These questions may be answered by putting a hole or a mark in the proper space. The hole may be made by a pencil, a match, a nail, a finger-nail file, a hairpin, or any other convenient object. The cards may be scored by the trainee himself or students may exchange cards and score them.


TEST RESPONSE CARD

SEE REVERSE SIDE FOR DIRECTIONS

NAME

DATE | CLASS

TRAINING AID

☐ PRE TEST ☐ RE TEST

1 ☐	A	B	C	D	E
2 ☐	A	B	C	D	E
3 ☐	A	B	C	D	E
4 ☐	A	B	C	D	E
5 ☐	A	B	C	D	E
6 ☐	A	B	C	D	E
7 ☐	A	B	C	D	E
8 ☐	A	B	C	D	E
9 ☐	A	B	C	D	E
10 ☐	A	B	C	D	E
11 ☐	A	B	C	D	E
12 ☐	A	B	C	D	E
13 ☐	A	B	C	D	E
14 ☐	A	B	C	D	E
15 ☐	A	B	C	D	E
16 ☐	A	B	C	D	E
17 ☐	A	B	C	D	E
18 ☐	A	B	C	D	E
19 ☐	A	B	C	D	E
20 ☐	A	B	C	D	E

SCORE

NO. PRE TEST NO. RE TEST GAIN

(FRONT)

DIRECTIONS

To the student:

Use pencil to mark out (☒) the letter which indicates the correct answer to each question. On true-false tests, use column "a" for true, column "b" for false. On other tests, use columns as needed.

To the instructor:

1. This card is for use with —
 a. Objective tests accompanying Training Aids Guides.
 b. Objective tests made up by instructors.
2. Issue two cards to each student when both a pre-test and a re-test are given. Have the student place a check mark in the space provided to identify each test.
3. As you read the correct answers, have the student mark out (☒) the number of each question for which he chose the correct answer. It is then a simple matter to figure both scores. When the cards are used for pre-test and re-test, the gain should be recorded on the re-test card.

(BACK)

5. *Review job problems.* All weaknesses, errors, or misunderstandings which were revealed by the quiz should be corrected immediately. Patiently restrain the impatience of each trainee. Reshow the film or part of the film that will clear up any misunderstandings. The final test is: Can the trainees perform the job

problem correctly? Remember, *if the trainee hasn't learned—the instructor hasn't taught.*

Instructor's Manual and Film Guide

Each training group, each job problem, and each situation will determine the specific teaching technique to be used. If necessary, deviate from the suggested procedure. Your objective is to give more effective job training. The trainee is the most important thing to be considered. Instructor's manuals and guide sheets, which often accompany films, are very helpful in determining your procedure.

How to Operate Motion Picture Projectors

Types of projectors. There are several types of silent and sound projectors which are suitable for use in the training room. The most popular models are the Ampro, Bell and Howell, DeVry, Eastman, Keystone, R. C. A., and Victor. The basic principles of projection are similar in all types; however, each projector is somewhat different from the others.

To get smooth performance check the following points:

Silent film.

1. Follow the instructions which accompany the projector. If these directions cannot be located, request the manufacturer to send new ones. Be sure to state model number of the machine.
2. Use alternating current. If only direct current is available, check instructions.
3. Place projector so that a satisfactory image is obtained on the screen.
4. Examine threading chart before putting film into projector. Most machines require top and bottom film loops at the film gate for satisfactory performance.
5. After threading film in projector, test its operation with the hand before turning on motor. Remember, if your projector requires the two loops, they must be maintained.
6. Frame picture on screen.
7. Bring image to sharp focus by adjusting lens.
8. Set projector for "silent" or "sound."
9. Rethread machine to the first title before presenting it to the group.

10. Stop projector as soon as the last picture appears, and remove the film from the projector after the group is dismissed.

Sound film. If you are using a sound training film, you must also check the following items:

1. Unless the speaker and projector form one single unit, the cable must be plugged into the amplifier outlet.
2. Locate the speaker near the screen, and off the floor. Check the sound system.
3. The amplifier should be warmed up several minutes before projection is started.
4. Turn up volume after starting picture. Too much volume impairs hearing.
5. Adjust tone control to obtain clear sound.
6. Turn down volume before stopping picture.

Rear Projection. Rear projection is made possible by the use of a translucent screen. The projector is placed behind the screen and the projected image appears on the front of the screen. This type of projection is extremely helpful when it is impossible or undesirable to darken a training room. Very little space is required between the projector and screen.

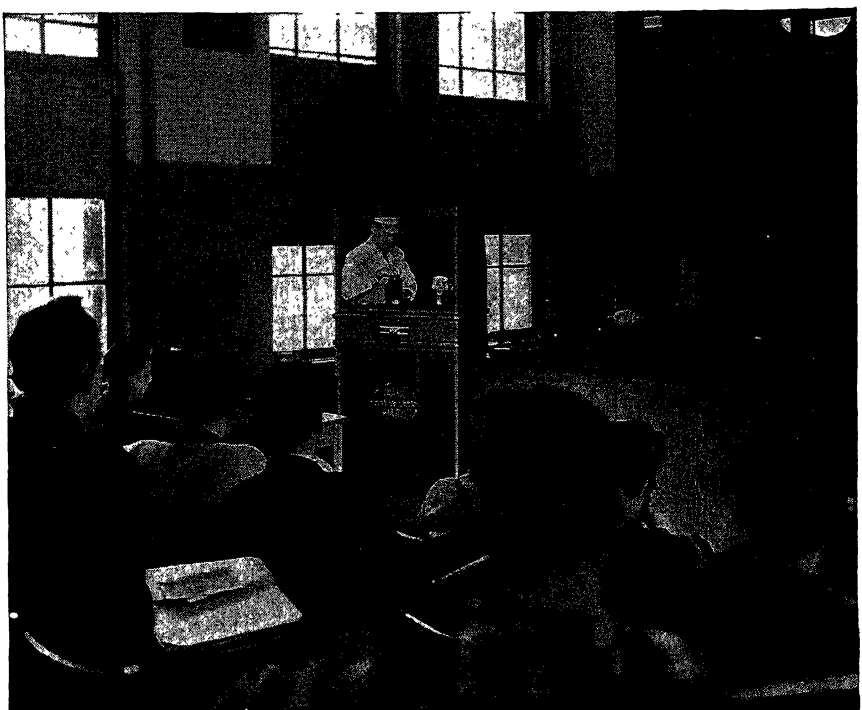
Compact, portable units for silent and sound films, such as the Sono-Vision, Automotion, and TSI Suitcase Projectors, contain both screen and projector and are convenient to use. The instructor merely inserts the film in the conventional manner and starts the projector. The picture then becomes automatically focused and framed on the screen.

Caring for the projector.

1. Keep your machine clean, especially the film gate track. Neglect interferes with good performance and harms the film.
2. Oil the machine according to directions. Improper lubrication causes excessive wear and interferes with operation.
3. Spare lamps. To avoid being left in the dark, have a spare projector lamp and exciter lamp on hand at all times.
4. Replacement parts. It is also advisable to have a replacement belt, electric plugs, and sufficient extension cord, especially if your projector is of the portable type.

Miscellaneous hints. Silent film may be used in a sound projector, but it is impossible to use sound film in a silent projector.

A standard reel of silent film carries 400 feet of film, and the showing time is approximately fifteen minutes. A similar-sized reel of sound film requires approximately ten minutes showing time. Silent film is projected at the rate of 16 frames per second and sound film projects at the rate of 24 frames per second. In order to save time or to "liven up" a silent film presentation, the projector may be operated at sound speed. However, this should not be attempted where "timing" is an essential part of the film feature.



Courtesy of Mills Industries, Inc.

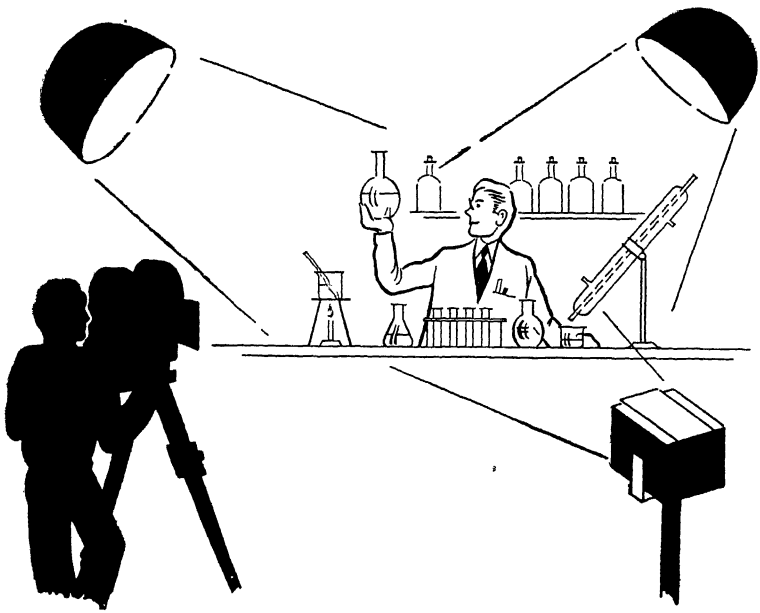
COMBINING THE PROJECTOR, SCREEN, AND SPEAKER IN ONE PORTABLE UNIT.

The majority of 16 mm. film is projected with the dull side facing the screen, and the pictures are inverted as they pass through the projector. Color films and prints made from reversal film are projected with the dull side in and the shiny surface facing the screen.

When a "still" is desired while the film is in motion, it is usually necessary to focus the lens, after stopping the machine. Refocus lens when the projector is started again.

How to Make a Training Motion Picture

Advantages of home-made films. Home-made films are valuable because they may be made to illustrate or clarify specific job problems in training. These job problems deal not only with developing manipulative skills, but also pertain to many other job tasks such as developing proper work attitudes, building morale, and giving familiarization training.



Another important function of home-made film is community interpretation and public relations. Everyone, for example, likes to see himself or his business in a movie. Few businesses and training institutions have taken advantage of this potent phase of home-made motion pictures.

Suggestions for making home-made films. The following suggestions [1] will be helpful in preparing home-made film:

Selecting the subject. One of the first questions to ask is whether or not motion is necessary. If not, a good slide might serve the purpose better. Next, it will be well to ascertain whether or not such a subject has been produced. If the subject has been produced somewhere else, professionally, it would be better and cheaper to purchase a print of that subject. The next problem will be to determine whether or not the

[1] Dent, Ellsworth C., *Audio-Visual Handbook.* Chicago, Ill.: Society for Visual Education, Inc.

various scenes required for the production are accessible to the camera. The subject should have a real purpose and that purpose should be defined clearly before production is started.

Preparation of outline or "scenario." It is essential that a plan of production be determined. Much film will be wasted if scenes are shot without relation to the plan of the picture, and much additional time will be required to fit these random shots into the production. After selecting the subject, therefore, the next essential is that of outlining, definitely, the content of the picture. Scenes selected must have a direct relation to the central purpose of the production.

Once the required scenes have been determined, these should be arranged in logical sequence, and the production viewed as a whole. If it is then found to be satisfactory, the plan can be turned over to the person with the camera, for the shooting of the picture.

Selecting a suitable camera. The choice of a camera for this type of production will be determined by the material to be produced. If all the material planned is to be photographed in normal action, almost any of the inexpensive motion picture cameras will be satisfactory. As variations become necessary, the need for care in selecting the equipment is increased. If slow-motion pictures are contemplated, a camera with variable speeds is essential. If subjects are to be photographed at long range, lenses of different focal lengths will be needed. If interior pictures are to be taken, it may be necessary to use lenses with greater speed than ordinary lenses.

Good cameras will range in price from $60.00 upward, with the average all-purpose camera ranging in price from $150.00 to $400.00 with a complete assortment of lenses and accessories.[2]

Selecting film stock. The selection of film to be used for any given situation should be given some consideration. The ordinary negative stock should be used for those pictures which are to be used for several prints. The majority of the amateur producers, however, will not have need for additional prints and will find the reversible film to be more economical. Prints can be made from the reversible film, and the process is reasonably satisfactory. The reversible film, as the name suggests, is converted from negative to positive in the processing, and comes back to the photographer ready for projection.

The reversible film is divided into three principal classifications: orthochromatic, panchromatic, and super-sensitive panchromatic. The first is being replaced by "Verichrome" and "Plenachrome" film, which are satisfactory for all general purposes. The panchromatic film is used extensively for pictures where reasonably good light is available for the exposure. The super-sensitive film should be used in poor light or for pictures under artificial light, as it is much more sensitive to artificial light than is either regular or panchromatic film.

There are natural color films available which add much to the value of those subjects in which color is important. The color films are a little more expensive than films for photographing in black and white

[2] Refer to Appendix II for list of camera manufacturers.

and may not be duplicated as easily. The proper projection of color film requires stronger illumination than is necessary for projecting ordinary film, but the new projectors with 1000- and 1200-watt lamps project color well even in large rooms. It is seldom desirable to combine ordinary and color film in the same subject.

"Shooting" the picture. After the scenario has been arranged and the equipment and film selected, the important task is that of taking the scenes to be included. There are a few simple rules to be followed which will be of assistance to the amateur, and these are mentioned below. Experience is a dear teacher and those who operate the camera without first giving attention to certain simple suggestions may find that very expensive film has been wasted.

1. Use a reliable exposure meter to determine the proper lens setting. This cannot be overemphasized and such a meter should be used for each different situation. Light values are difficult to guess, even for the professional.

2. Keep the lenses immaculately clean. The least bit of dust or oil on the surfaces of the lenses will have a tendency to destroy the true picture. A lintless linen cloth or a piece of lens-cleaning tissue will be satisfactory for cleaning.

3. Keep the camera clean and well oiled. The very accurately machined parts of the mechanism must have ordinary care in cleaning and oiling if the best results are to be obtained. Follow the instruction book with the camera.

4. Hold the camera steady at all times. This can be accomplished only by using a sturdy tripod, which is almost as necessary as a camera if good pictures are to result. It is almost impossible to hold any motion picture camera steady in the hands and it should not be attempted except in extreme cases where it is impossible to use a tripod.

5. Make complete scenes; not bits. A simple rule to follow is to count slowly to ten for any scene, increasing the length of the scene as may be needed to complete the picture of the action to be recorded. Short exposures are unsatisfactory and will waste much film.

6. Shoot action shots at an angle. Pictures of rapid action should be photographed at an angle of approximately 30 degrees, with the action moving toward the camera. Pictures taken at right angles or directly behind or in front of the action are usually unsatisfactory.

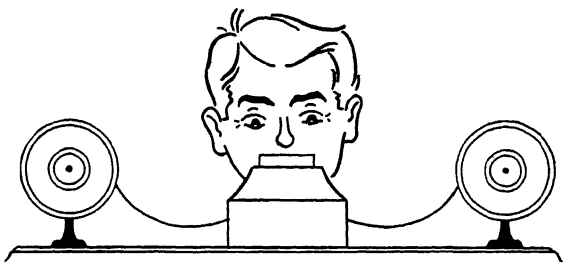
7. Use filters whenever possible. A filter will tend to give a more nearly true recording of color gradations and will result in smoothness of detail which is not possible without a filter.

8. Do not "pam" the camera. It is best to set the camera in a stationary manner and let the action move through the field of the lens. Turning the camera from one point to another while the picture is being taken, except at very high speeds, will produce a jerky result.

9. Use half-speed or slow-motion variations only when necessary. If it is desirable to slow down the action of the subject, pictures may be taken at 32 or 64 frames per second. Football pictures seem to be

best at 32 frames per second, as normal action is too rapid for careful study of the plays. The half-speed pictures have but a minor place in a film, except for variety.

Editing the film. After the films have been exposed and processed, it will be necessary to "edit" them. The scenes will be joined together



without titles and it will be necessary to insert proper explanatory titles ahead of each scene. The following suggestions may be of assistance.

1. *Cut out all inferior scenes.* If some of the exposures have not been entirely satisfactory, throw them away and re-take them, rather than spoil a good film by leaving them in it.
2. *Use attractive titles.* Cheap and irregular titles will spoil an otherwise satisfactory subject. Titles can be made, but it is usually more satisfactory to have them prepared by an experienced title maker. Furthermore, a good title maker will be able to make suggestions as to the most attractive way to arrange the titles. There are several organizations which will prepare the titles at the usual commercial rates—25 to 45 cents for ten words or less—and will assist with the editing at a nominal additional charge.
3. *Splice the film carefully.* Good splices are essential if the film is to operate smoothly in the projector. Follow the instructions that accompany any good splicing outfit.
4. *Do not show the film until edited.* The desired effect of many amateur productions has been jeopardized by showing the pictures before they have been titled and edited. An unedited picture is almost certain to leave a poor impression.
5. *If the picture is to be used extensively,* have a "dupe" negative prepared from which additional prints may be made, and save the original. If it is not to be used more than forty or fifty times, the duplicate print will not be necessary.

For more information on the actual production of instructor-trainee-made films, refer to "How to Make Good Movies." [3] It

[3] Eastman Kodak Company, Rochester, N. Y. May be purchased at most local photography stores for approximately $2.00.

discusses the subject of home-made movie-making from all angles in a nontechnical manner.

Example of Content of Home-Made Film

Store training and agricultural and industrial problems are especially adapted to treatment through the medium of home-made films. For example, a few of the store problems that are easy to illustrate through moving pictures are:

1. How can stock arrangement be given "customer appeal"?
2. How can a salesperson assist a customer in the selection of merchandise?
3. How can a salesperson increase a sale by suggesting new merchandise?
4. What are the steps in setting up an interesting window display?
5. Why it is important to know all the possible selling points of your merchandise?
6. How can a salesperson gain merchandise information on the job?
7. How can a salesperson increase a sale by suggesting related merchandise effectively?
8. How can a salesperson increase a sale by suggesting the larger and more economical size?
9. Why are attractive interior decorations and displays important in selling?
10. Why is well-kept and neat merchandise an important aid in selling?
11. What specific techniques should a salesperson use in showing merchandise to a customer?
12. What are the important things to remember when wrapping merchandise?
13. How should a cash transaction be handled?
14. How can we increase a customer's desire by handling the merchandise effectively?
15. Why should a salesperson know how to analyze and "size up" a customer?
16. Why are adequate and accurate records so important in business today?

17. What are the psychological effects of an attractive window display?

18. What should a salesperson know when ordering new merchandise?

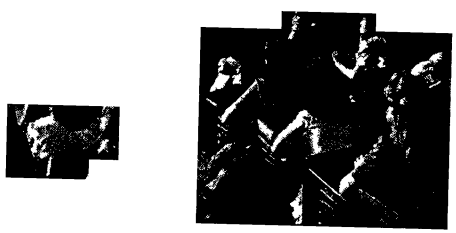
19. How can a salesperson increase a sale by suggesting specials and larger quantities of merchandise?

20. Why should a salesperson use the merchandise approach?

21. How can a salesperson increase a sale by suggesting merchandise for special occasions?

22. How can a salesperson help a customer select the proper size and style?

23. Why is a knowledge of color, line, and design essential in selling?



Courtesy of Victor Animatograph Corp.

USING MOTION PICTURES TO SIMPLIFY INDUSTRIAL TRAINING.

DO's for Using Motion Pictures

DO vitalize your training with pertinent motion pictures.
DO secure a suitable training film catalogue.
DO order training films at least thirty days in advance.
DO check accompanying instructor's manuals and film guides.
DO preview film before using it.
DO set up projector and focus image on screen before group meets.

DO have sufficient lengths of extension cord, plugs, and extra projector lamps.
DO check seating.
DO check lighting.
DO check ventilation.
DO prepare trainee before presenting film.
DO present film in a smooth, professional manner.
DO use film information as soon as possible.
DO test trainee's performance of the job problem.
DO reshow film if necessary.
DO make your own training film to cover specific job problems.



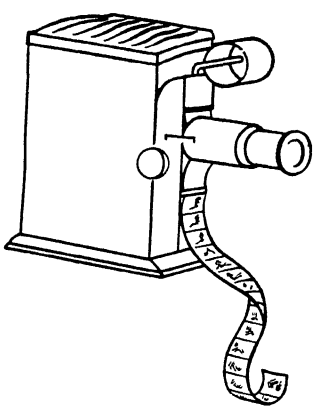
Courtesy of the Jam Handy Organization

A Sound Slidefilm Projection for Jor Training.

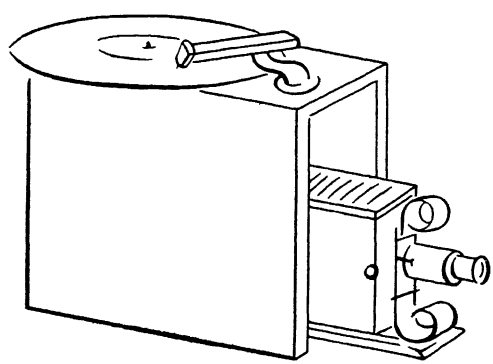


Discussional Stripfilm and Sound Slidefilm

IN MANY TRAINING AREAS the stripfilm and slidefilm are considered the most potent type of visual training aids. The use of these aids in practically any training situation will give equally satisfactory results. One advantage over the motion picture is that each picture on the discussional stripfilm or sound slidefilm, when used without a record, can be readily projected on the screen for any length of time. Trainees and instructor can then discuss the contents as exhaustively as may be required by the rate of learning desired.



Discussional stripfilm is a continuous strip of film consisting of individual frames or pictures arranged in sequence, usually with explanatory title. Each strip contains from twenty-five to one hundred pictures having suitable copy.



Sound slidefilm is similar to stripfilm, but

instead of explanatory titles, explanations are given audibly by a record which is synchronized with the picture. A faint ring of a bell indicates when the next picture should be shown.

The film itself is the "candid camera" or 35 mm. type used for making individual pictures or slides, but the strip of film is uncut. If used properly, sound slidefilm will increase trainee interest, clarify job problems, and save considerable training time. The compact form, ease of projection, and extreme low cost of sound slidefilm have contributed greatly to its widespread use. A large number of commercial training film producers are concentrating their efforts on this type of visual device, and eventually, a majority of the training areas will be adequately covered.

Sources of Stripfilm and Slidefilm

A list of available material and sources can be found in the following catalogues:

1. *Visual Training Aids,* Castle Films, Distributor Corporation.
 (*a*) 30 Rockefeller Plaza, New York 20, N. Y.
 (*b*) Field Building, Chicago 3, Ill.
 (*c*) Russ Building, San Francisco 4, Calif.

This catalogue contains a complete list of the training material produced by the United States Office of Education, United States Department of Agriculture, War Department, and Navy Department. It may be obtained free of charge by contacting the nearest office.

2. *Slidefilm and Motion Pictures to Help Instructors,* The Jam Handy Organization, 2900 East Grand Boulevard, Detroit 11, Mich. (Free of charge.)

3. *Picturol Catalogue,* Society for Visual Education, Inc., 100 East Ohio Street, Chicago 11, Ill. (Free of charge.)

4. *Stillfilm Catalogue,* Stillfilm, Inc., 8443 Melrose Avenue, Hollywood 46, Calif. (Free of charge.)

5. *An Index of Educational and Visual Training,* Westinghouse Electric and Manufacturing Company Central District, 306 Fourth Avenue, Pittsburgh, Pa. (Free of charge.)

6. *Sources of Visual Aids for Retail Training,* Harry Q. Packer, Middlesex County Retail Training Bureau, Woodbridge, N. J. (Price—$1.00.)

How to Use Stripfilm and Slidefilm

Determine the right spot. With a list of available stripfilm and slidefilm in mind, the instructor should check through his training plan and note the specific job problems that could be clarified by the use of these aids. Placing the title and date for using a stripfilm or slidefilm in a visual aid column in the training plan will serve as a reminder and will indicate when the neces-

sary projecting equipment should be secured. From time to time, new material covering various subjects will appear on the market. Do not hesitate to revise your training plan in order to keep up to date.

Determine the correct stripfilm and slidefilm. Although it is possible in most cases to operate these films so that only a few selected pictures or frames are used, it will be more convenient to cover the job or subject by showing the pictures or frames in their normal sequence. Make certain the stripfilm or slidefilm pertains to the specific training problem. Many businesses and schools have found it necessary and worth while to produce stripfilm or slidefilm to cover specific training jobs or subjects peculiar to their activities. Producing stripfilm or slidefilm is a simple operation, which will be explained later in the chapter.

Check all physical features. In order to assure a successful presentation, the instructor should check the training place, seating arrangement, and projection.

Training place. The training place must be prepared if the most effective training is to result. Below are five things to check.

1. Test electrical outlet to make certain you have electrical current when the room lights are off.
2. Provide sufficient ventilation—a stuffy atmosphere retards learning. Sacrifice light for ventilation.
3. Prevent outside light from glaring into trainees' eyes—glaring light causes poor visibility.
4. Avoid placing screen in a cluttered room. All unrelated visual aids should be removed.
5. Place "Keep Out" signs on door to prevent people from entering during showing—traffic distracts attention.

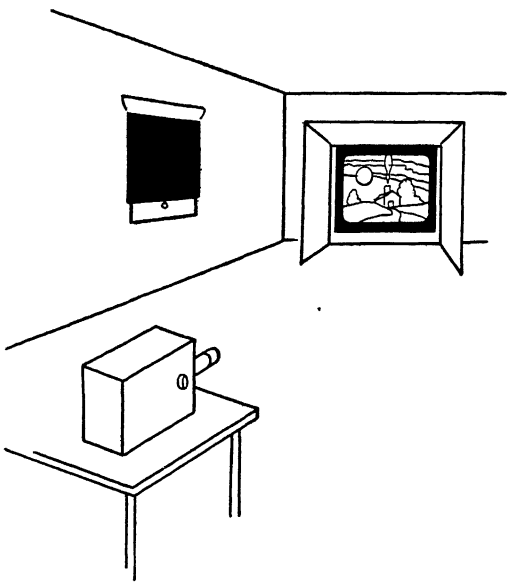
Seating arrangement. Properly seated trainees learn more and remember longer. Bad seating brings poor results. The following suggests what to do to get beneficial results.

1. Avoid crowding. If necessary, divide group into two sections.
2. Seat as many trainees as possible between projector and screen—this is the best position for observing picture.
3. Place chairs as close as possible to the light beam.
4. Keep all chairs within a space formed by a 60-degree angle.
5. The floor or a wooden plank may be used for chairs, but if

possible, use soft, comfortable seats. A comfortable environment accelerates learning.

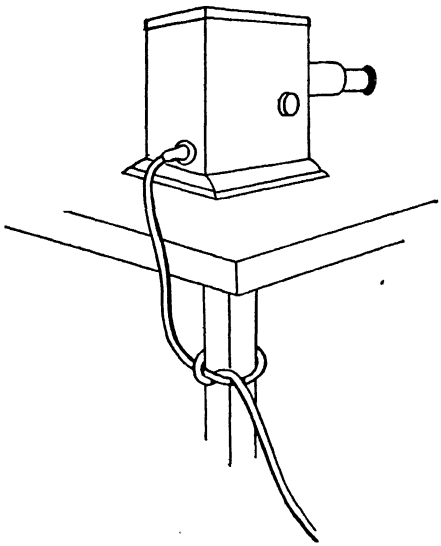
Projecting the slide or stripfilm. The skill with which a slidefilm or stripfilm is projected often determines the value of the training being offered. Some of the procedures related to projecting slidefilm and stripfilms are:

1. Under most circumstances, a darkened room is more effective than a lighted one.



2. In a semidark room, use a small, sharp image for better vision.
3. Use a brighter lamp for projection in an undarkened room.
4. Place screen in a position to avoid direct rays of outside light. If necessary use a shadow box. A makeshift shadow box can be prepared out of cardboard or thin sheets of wallboard.
5. A larger picture requires a darker room.
6. If possible, use a beaded or white screen. A beaded screen usually will provide a more brilliant image but also causes a slight distortion when viewed from the ends of a wide room. In this case a plain white screen is recommended.
7. When using the back of a map or a makeshift screen of paper or cardboard, the screen must be smooth and flat to avoid obtaining a distorted picture.
8. Place projector in a direct line in front of screen to insure proper focusing.
9. Set projector on a sturdy table or stand and, if possible, high enough to extend over the heads of the group.
10. Fasten the electric cord to the leg of the table to prevent it from being knocked off in the event someone should trip on the cord.

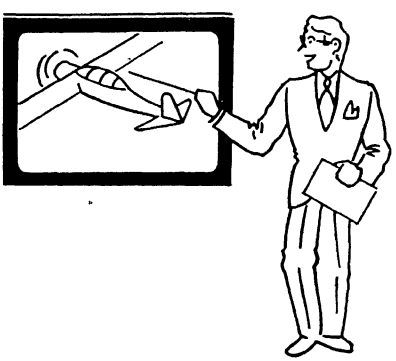
Presenting the stripfilm and slidefilm. Each training group



and each job problem will require special handling. Just as your procedure will vary in training beginners, advanced students, or employees, so will it vary with the activities or types of products being manufactured, processed, or sold by your training groups. Change or deviate, but observe the following basic steps for proper presentation of your job problem.



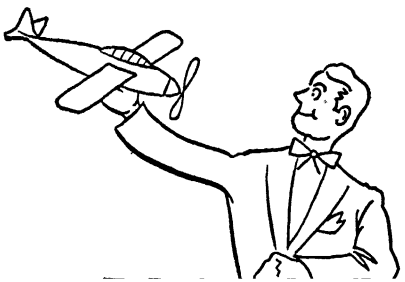
1. *Prepare trainee.* First with a few brief, pertinent remarks, put your trainees at ease. Do not confine your opening remarks to the weather or other unrelated trivia, but study your group for clues to what would interest it. Sometimes merely giving the trainees your correct name will do the trick. Second, arouse each trainee's interest by showing him how he will benefit from a knowledge of the subject.



Third, point out the important points that trainees should observe in the film, and, fourth tell them that their knowledge of the job or subject will be thoroughly tested.

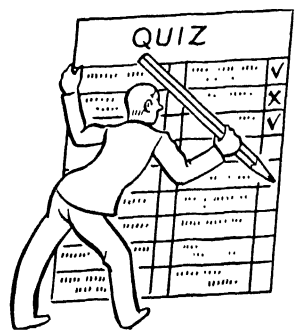
2. *Present film and instructions.* Present each frame smoothly. Allow trainees sufficient time to read the titles on the stripfilm. Remember that you have seen the films before, but that the trainees have not; therefore give the trainees a little extra time. Read each title to the group in a clear and interesting fashion.

When using slidefilm, change the frame as soon as the signal is given.

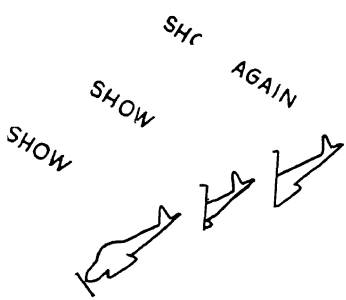


When job-problem topics or subjects are extremely complex or lengthy, stress the principal steps or ideas, and then reshow the stripfilm without reading the titles, and the slidefilm, without the sound. Remember there is a limit to how much trainees can grasp at one time.

3. *Apply training.* If possible, permit trainees to apply their new knowledge immediately. Allow them to perform and explain each step. Insist upon proper speed, timing, and the use of correct terms. They must be able to perform the job properly, or the instruction will largely be wasted.



4. *Test trainees.* Check each trainee's performance. Observe his errors and weaknesses—then retrain, if necessary. Each error should be corrected and each weakness improved.



Factual and attitude job problems are best tested by simple check sheets or response cards. Questions of the objective variety, such as true-false, multiple choice, completion, or matching type, are effective, since they are easy to make, rapidly graded, and at a glance will reveal individual trainee weaknesses.

5. *Review subject or problem.* If necessary, reshow the entire film. However, stripfilm and slidefilm are especially adaptable for exhibiting certain sections of the film, and it is only necessary to use those portions which require reshowing. The final test of suc-

cessful education or training is: *Does the student or trainee understand the subject or can he perform the job?* Remember, *if the trainee cannot understand the subject or perform the job, the instructor has not taught effectively.*

How to Operate the Stripfilm Projector (S.V.E. Model AAA)[1]

This tripurpose projector is equipped with a 300-watt lamp, 5-inch anastigmatic lens, semiautomatic vertical slide changer, carrying case, and rewind take-up; it sells for approximately $70. This type of projector will show (1) 35 mm. single frame, (2) 35 mm. double frame stripfilms, and (3) 2 by 2-inch slides. Other similar projectors are on the market, and there is little difference in how they operate. With a little practice, this projector can be set up and made ready for use in less than a minute. Follow these directions: [2]

1. Remove projector and lens from case.
2. Carefully insert lens into the lens barrel.
3. Extend the two legs at the front corners of the base of the projector.
4. Raise the retainer bar on the film magazine with one hand, and with the other, release the catch spring on the lens barrel and swing it back.
5. Place the rolled-up stripfilm in the film magazine at the top with the dull side of the film toward the lamp. Make sure the pictures are upside down.
6. Place the free end of the stripfilm into the film track.
7. Lower retainer bar to keep the film roll in the magazine.
8. Pull the free end of the stripfilm down flat past the aperture glass until the stripfilm engages the rewind take-up can.
9. Engage the holes along the edges of the film with the teeth on the sprocket wheels, located below the glass aperture.
10. While holding the film against the sprockets with the right hand, swing the lens barrel completely shut on the film with the left hand. Be sure the catch spring holds firmly.
11. Turn on the lamp switch and adjust the projected picture.

[1] Society for Visual Education, Inc., Chicago, Ill.

[2] Based on the stripfilm "Vivid Visualization," prepared for the U.S. Army Training Division by the Society for Visual Education, Inc., Chicago, Ill.

12. Push film control knob inward, and turn it clockwise until the focusing frame or title appears on the screen. Release pressure on knob so it will spring back into operating position.

13. To focus image, turn the lens clockwise or counterclockwise until the picture appears sharp on the screen.

14. To increase the size of the image, move the projector to the back of the room; to decrease the size, move the projector forward.

15. To raise the projected picture on the screen, steady the base of the projector with the left hand and pull out the elevation lever to the desired height with the right hand.

16. To frame a picture sidewise, turn the screw on the side of the film gate right or left until the picture is centered on the screen.

17. The next picture will spring into position ready-framed by turning the film central knob a quarter turn clockwise.

18. At "The End" title, switch off the lamp.

19. Turn the film central knob until the stripfilm is completely out of the projector.

20. Do not tilt projector beyond its normal tilting angle. The lamp was designed for upright burning only.

For specific information on how to use your tripurpose projector for showing 35 mm. double-frame stripfilm, refer to the manufacturer's instructions which accompany the machine.

How to Operate the Slidefilm Projector

A slidefilm projector is a combined projector and record player. As the record plays, the operator unreels the pictures in the film. A faint chime indicates when to advance the next frame to maintain synchronization.

The record used with the slidefilm projector has the appearance of an ordinary popular record, but is prepared to play at the rate of 33⅓ revolutions per minute instead of 78 revolutions per minute. This makes it possible for a record to play approximately 15 minutes before it becomes necessary to turn it over.

Both stripfilm and slidefilm may be used in the slidefilm projector without the record player. The most commonly used slidefilm projectors are the *Illustravox, Jr., Operado Explainette,* and the *Picturephone.* Their general appearance and housing are dif-

To insure proper performance of slidefilm projectors check the following suggestions:

1. Follow the manufacturer's instructions for operating your specific projector.
2. Set the projector for either alternating or direct current. On most machines, this is controlled by a small switch.
3. Insert film, turn on projector lamp, and focus the first frame.
4. Change needles frequently.
5. Turn on the motor and warm up the tubes. If your machine has a volume and tone control, play part of the record to check it.
6. Set the arm at the correct starting point. Usually this is on the outside of the record, but occasionally it starts on the inside. The correct starting point is indicated on the record.
7. When the bell sounds, advance the slidefilm. After you get the "feel" of the mechanism, each frame should snap into position rapidly and smoothly.

How to Make Stripfilm and Slidefilm for Your Training Purposes

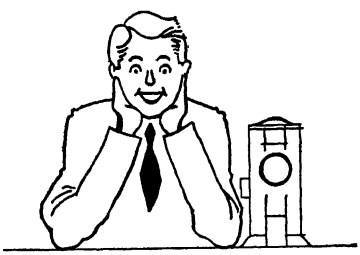
Anybody who has a 35-mm. camera can make a simple stripfilm. A stripfilm is merely a series of individual pictures arranged in a specific order on a strip of film. When these 35-mm. pictures or "shots" are used individually, they are commonly known as 2 by 2-inch slides. The following chapter on *Training Slides* will give specific information on how to prepare these pictures.

In preparing the stripfilm it is important to:

1. Prepare a script.
2. Plan each "shot."
3. Arrange each picture in the proper sequence.
4. Photograph each scene in the proper order. If you have used kodachrome film, clip the corner of the return address tag. This indicates that the film is to be developed in strip form and not cut into individual slides.
5. If it is impossible to take the pictures in the proper order, collect all the desired shots, indicate the proper sequence, and have the picture put on a strip of film. This service is offered by most local photography stores.
6. Titles may also be added to your stripfilm by your local photographer.

7. Carefully store your film in a stripfilm container.
8. Title and file each stripfilm on the top of the container.

Slidefilm records for home-made stripfilms. A home-made stripfilm may be converted to a slidefilm by preparing an accompanying record. The fidelity of home-made records is not as great as those produced commercially. However, with care and practice, you can produce satisfactory results. An ordinary recording set or radio attachment that can cut records at 33⅓ revolutions per minute will be suitable.



Carefully plan your slidefilm record by proceeding as follows:

1. Prepare a brief, pertinent script for each frame.
2. Select someone having a good "radio announcer" voice.
3. To obtain accurate timing, practice reading the script while the film is being projected on a screen.
4. Use a small call bell for the signal between frames.
5. Cut the record, following the directions that accompany the recording set.

Examples of Content of Home-Made Stripfilm and Slidefilm

You will be repaid many times for the effort you exert in preparing home-made training films. Their chief value is that they are made to illustrate and clarify your own specific training problems. For example, here are a few typical retail-store problems that have been shown in stripfilms and slidefilms:

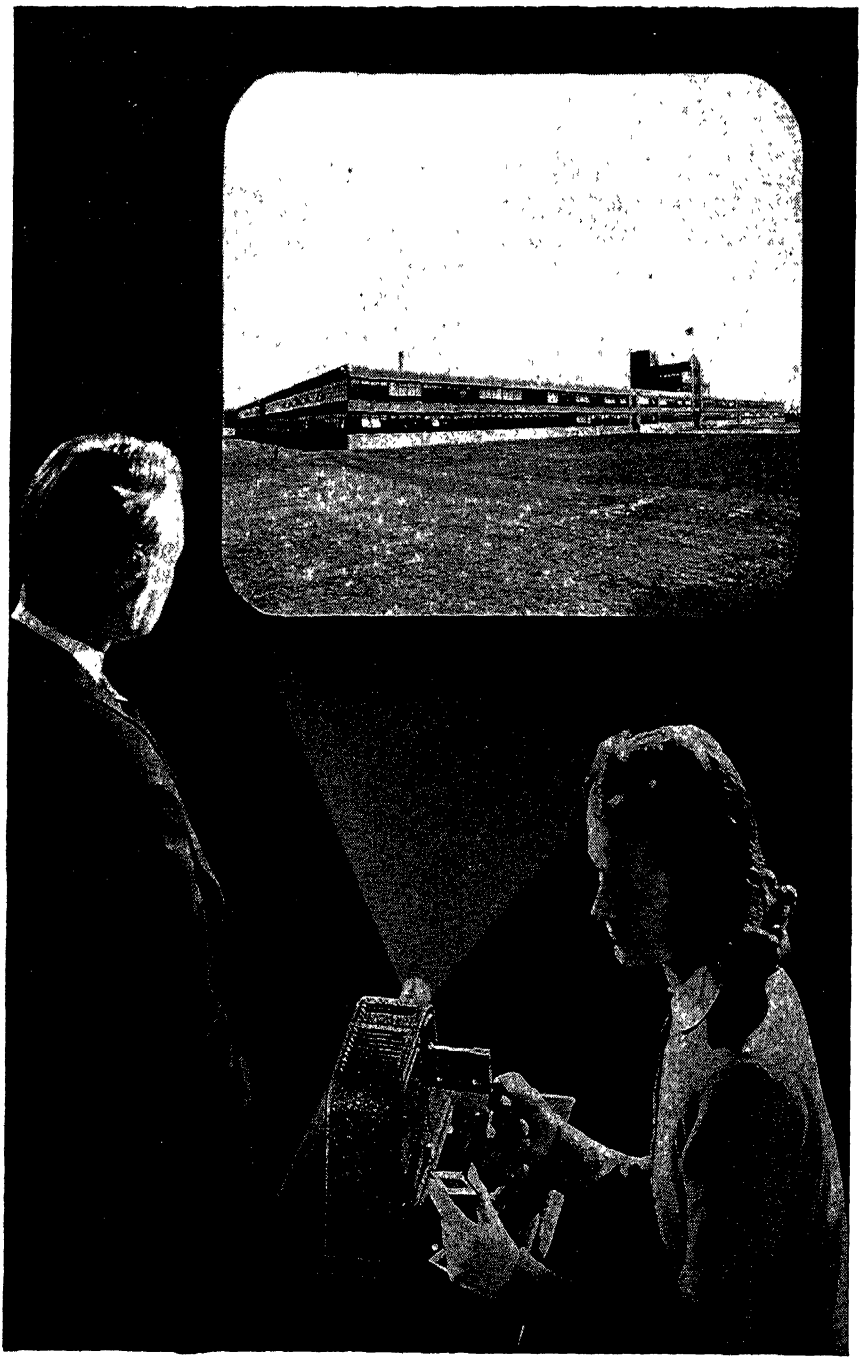
Merchandise information
Customer routing
How to set up a counter
How to make price cards
How to display merchandise
The buying process
Sources of buying information
Community opportunities
How to use record systems
Employee morale
How to sell
Merchandise appeals
How to prepare an advertisement
How to keep a customer
How to increase a sale
How to arrange merchandise on shelf
How to trim a window
How stores lose customers
How to operate a cash register
How to improve customer contacts

The wide-awake instructor will find many job problems, manipulative skills, general information, and learner attitudes pe-

culiar to his own situation that could be converted and illustrated in stripfilm for more effective training. Slidefilms and stripfilms are applicable to any school or occupational training need.

DO's for Using Stripfilm and Slidefilm

DO determine the job problems that could be effectively illustrated.
DO select the proper stripfilm or slidefilm for the specific job problem.
DO secure training film catalogues.
DO preview film before using it.
DO follow suggestions in film guides and instructors' manuals.
DO check training place.
DO check seating arrangement.
DO check projection.
DO prepare trainee before presenting film.
DO present film in a professional manner.
DO use a pointer to direct attention to specific details on screen.
DO permit trainee to apply knowledge immediately.
DO test trainee's understanding.
DO reshow film if necessary.
DO follow manufacturer's instructions for operating your specific projector.
DO prepare stripfilm and slidefilm to cover your own job problems.



Courtesy of American Optical Co.

2″ x 2″ SLIDES AND PROJECTOR.



Training Slides

Value of slides in training. The use of a single slide can vitalize an entire training session; one slide can make a topic or a job problem remain vividly in the memories of your trainees. This is the reason for the success of this training device. A few carefully selected slides or even one pertinent slide can:

1. Attract attention.
2. Arouse interest.
3. Assist job development.
4. Test trainee's understanding.
5. Review training.
6. Present the next job problem or subject.

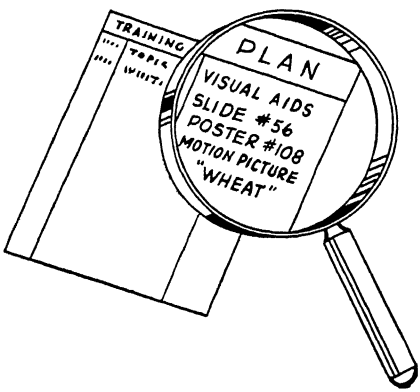
The versatility, facility of selection, low cost, and ease of preparing slides make them important training tools.

Sources of training slides. An excellent list of sources for slides, including colleges, universities, state museums, state libraries, commercial organizations, federal and state agencies, will be found in Appendix II.

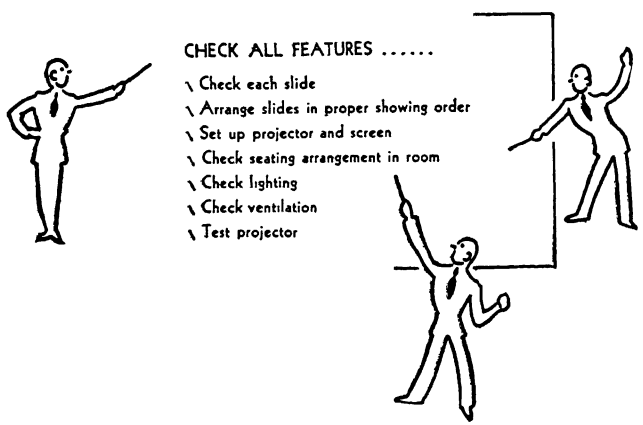
A knowledge of available slides will be helpful in making proper selection. However, you will soon discover that even though a large number of slide collections exist, the specific slide that you would like to use is not available or does not exist. Should you give up the idea at this point? Definitely, not. Most likely you can make the slide in your own training room. Many youngsters in elementary school have prepared excellent "handmade" slides.

How to Use Slides

Determine the right spot. At the beginning of the training sessions, check through your training plans and note specific spots where the use of a slide would materially help in the improvement of instruction. Efficient trainers will have already devoted a column in their plan books to include visual aids.



Record the type and number of slides required for the specific job problem. A dated and well-laid-out plan book will act as a signaling device and inform the instructor in advance to have the slides and necessary equipment ready. Preparing necessary equipment will require several hours of initial preparation, but the instructor will find, in the long run, that it will actually save time. To keep training material up to date, it will be necessary for the instructor to revise it each succeeding year.

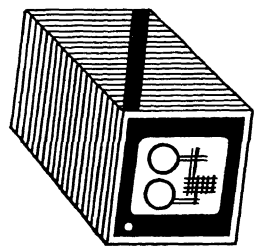


Check all physical features. The instructor can spare himself many sad experiences if he verifies the following items before the training group meets:

1. *Check each slide.* Make sure you know exactly what you will say or do with each slide. A guide sheet or a 3 by 5-inch card file related to each slide will increase effectiveness of instruction

and save much time. Each card should be filed with the corresponding number or title of the slide. Regardless of when the slide is used, you merely take from the file the card with the corresponding slide number, and needed information is then in your hands.

2. *Arrange slides in proper showing order.* If 3 by 5-inch information cards are used, make sure that they are in the same order as the slides. A desired showing order may be indicated by running a piece of colored scotch tape diagonally across the top of a set of slides, and then cutting the tape between each slide. A more permanent arrangement can be made by painting a similar diagonal line across the top of a set of slides.



3. *Set up projector and screen.* In an ideal situation, the projector and screen would be permanent fixtures of the instruction room, and it would only be necessary to switch on the current and perhaps lower the screen. However, in most cases, it will be necessary to place the projector on a stand or table and focus the light on the screen. The distance between the projector and screen is determined chiefly by the number in the group, shape of the room, and size of the screen. The larger the group, the more space will be needed between the projector and screen.

A light-colored wall, a home-made screen, or even the blackboard could be used instead of the regular commercial screen. When the projector is used in a large hall or auditorium, it will be necessary to increase the size of the lamp in the projector. Make sure the projector is focused, so that it will only be necessary to turn on the switch before projecting the slide.

4. *Check seating arrangement in room.* If the chairs are movable, they should be arranged in an area forming a 60-degree angle between the projector and screen. In a room equipped with secured desks or tables, the trainees should be confined to a similar area, avoiding entirely the use of the outer end seats on the front rows. It is also advisable to leave approximately a six-foot space in front of the screen.

5. *Check lighting.* Even though it is possible to exhibit slides in an undarkened room, it is suggested that the room be darkened as much as possible for the best results. The electric outlet for the projector should work independently of the room lights. Avoid

rays of light falling on the screen, and if possible, place the screen in front of the source of light.

6. *Check ventilation.* A poorly ventilated room can spoil an excellently planned lesson. A cardboard window ventilator, of the type commonly used in a "dark room," may be purchased at a nominal cost from most photographic supply stores. It is used at the bottom of the window like an ordinary ventilator, and this arrangement will permit air currents to enter the room but will keep light out.

During warm weather learning is retarded by a hot, stuffy room, particularly when the room temperature rises above 72° or the humidity above 50 per cent. By all means use a small air-conditioning unit or an ordinary electric fan.

7. *Test projector.* Project a slide on the screen and check it for clarity and centering. Even though a slide projector is simple to operate, do not attempt to use one that is unfamiliar to you unless you have experimented with it before the group convenes. If necessary, secure someone who can operate it. You will find it very valuable to teach a selected group of trainees to operate the projector. This will permit the instructor to devote his full time to the projected slide, group discussion, and job problem.

You are now ready for your group.

Presenting the slide. The haphazard exhibition of a set of slides results in ineffectual training. Each instructor should develop an effective plan. The following procedure has proved successful:

1. *Prepare trainees.* After the group is put at ease, the instructor should briefly state the problem to be solved. Arouse the trainee's interest by showing how an understanding of the job problem will materially benefit him. Point out what he should look for during the presentation and, finally, inform the trainee that he will be tested at the completion of the showing.

2. *Present slides and instructions.* The slides and instructions should be presented one step at a time in a logical and orderly fashion. Best results are obtained by proceeding from the known to the unknown.

Each slide should be projected long enough to allow sufficient time for study and comprehension. Because of the heat generated by the lamp, a glass-mounted slide should not be projected more than seven to ten minutes. A ready-mount cardboard slide may be

damaged and can become a fire hazard if kept in the projector more than two or three minutes. Shorter periods of time should be used when presenting colored slides, since these have a tendency to fade under a continuous bright light.

Using a pointer to focus the trainee's attention to a specific item on the slide is much more effective than pointing to the item with your finger.

Remember, there is a limit to the amount of knowledge a person can retain. Present no more than the trainee can master at one time.

3. *Apply the problem.* Immediately after the slides and information have been presented, the trainee should perform the job and explain each step in the operation. If the training consists of teaching a specific manipulative skill, trainee performance of the task is imperative at this time. The instructor should insist on correct timing and the proper use of technical terms.

Factual information or attitude training may be assimilated in a vitalized group discussion.

4. *Test trainee.* The trainee's understanding of the lesson should be thoroughly tested by the instructor. Check the trainee's timing, accuracy, and speed of performance, and carefully note errors. The test can be oral or written, but it should be brief, specific, and to the point. Objective examinations of the true-false, multiple choice, matching, or completion type have the edge on the more cumbersome and lengthy subjective examinations. The quiz card, mentioned in Chapter 1, has proved successful; it is a simple card that can be answered by merely punching a hole or putting a mark in the proper place.

5. *Review the problem.* All errors which were discovered during testing should be corrected and retaught. The instructor should not hesitate to show the training slides again. Only those which pertain to the trainees' specific weaknesses or errors need be repeated. Remember, *if the trainee has not learned—the instructor has not taught.*

How to Operate Slide Projectors

Kinds of machines. The standard 3¼ by 4-inch slides and the newer 2 by 2-inch kodachrome and black-and-white slides may be projected by a large variety of different machines. The trend in manufacturing is to combine multiple operations in one instru-

ment, such as the S. V. E. Tri-Purpose Projector,[1] the Bausch & Lomb Combined Baloptican,[2] and the Spenser Combination Delineascope.[3] Some of these models not only act as an opaque projector, but can also handle the 2 by 2-inch and 3¼ by 4-inch slides, filmslides, and microslides.

Although the principles of operation of each machine are similar, the instructions which accompany the projector should be carefully followed step by step: remember the manufacturer knows more about his machine than you do. Make three copies of the directions, and if possible, paste one copy in the projector case, paste another on a heavy piece of cardboard and hang it in the equipment cabinet, and place the third copy in your training-plan manual. The original may be placed in your file.

The most commonly used machines are the standard lantern slide projectors for the 3¼ by 4-inch slides and the Eastman Kodaslide and S. V. E. Tri-Purpose Projectors for the 2 by 2-inch slides. The simple directions which follow will give the best results.

Operation of the Standard Lantern Slide Projector

1. Carefully remove the projector from its case, and place it on a table or any other stable object.
2. Insert projector plug in electric outlet.
3. Adjust screen in front of projector.
4. Insert slide carrier in its holder. Check it for centering and secure it by tightening set screw.
5. Carefully pull the tubes beneath the bellows forward two thirds their length and make them secure by tightening set screws.
6. From a position in the rear of the projector, place a test slide in the right-hand side of the carrier and gently push the frame over to the center.
7. Turn on projector light.
8. Make image clear on screen by slowly pulling the focusing rods forward or backward. Secure them by tightening set screws.
9. Focus image critically sharp on screen by turning the objective lens backward or forward.
10. If necessary, straighten image on screen by loosening the

[1] For illustrated catalogue, write to Society for Visual Education, Inc., Chicago, Ill.

[2] For illustrated catalogue, write to Bausch & Lomb Optical Company, Rochester, N. Y.

[3] For illustrated catalogue, write to American Optical Company, Buffalo, N. Y.

wing nut under projector, tilting the machine, and tightening the wing nut.

11. To change the height of the image on the screen, adjust wing nut at the base of the projector.

12. Place slides in tray (to prevent sliding off table) on the right-hand side of projector, arranged in the correct order with all thumb marks in upper right-hand corner.

13. If necessary, open lamp house flap to permit light to fall on notes.

14. Present slides smoothly. Remove glare by placing your hand or a card over the lens while showing slides.

15. After showing, place projector in case by reversing the procedure, and return projector to storage.

Operation of the Eastman Kodaslide Projector (Model 1)

1. Place projector on table or any other steady support.
2. Set up screen in front of projector.
3. Insert electric plug in outlet and switch on the lamp.
4. Standing in back of projector, insert test slide in opening on the right-hand side.
5. Center the image and focus it on the screen by slowly turning the lens barrel left or right.
6. Place slides in proper order on right-hand side of projector with thumb marks in the upper right-hand corner. Keep them in a tray or box to prevent them from sliding off the table.
7. Keep the thumb mark in the upper right-hand corner as you insert the slide.
8. The new slide gently pushes out the previous slide on the left-hand side.

Operation of the S. V. E. Tri-Purpose Projector

1. Remove projector from case, and place on table or stable object.
2. Insert projector plug in outlet.
3. Adjust screen in front of projector.
4. Press catch spring to open barrel, unloosen set screw, and remove slide aperture.
5. Insert vertical slide carrier in correct position and close barrel.
6. Hold projector firmly with left hand and turn the lens bar-

rels and housing with the right hand until it assumes a horizontal position.

7. Insert lens mount into the barrel.

8. Place slides in tray (to prevent sliding off the table) on the right-hand side of the projector, arranged in the correct order with all thumb marks in the upper right-hand corner.

9. Standing behind the projector, insert test slide in carrier with the thumb marks in upper right-hand corner facing you, and push the slide into position.

10. Turn on projector light.

11. Focus image on the screen by turning the lens mount backward or forward.

12. If necessary, adjust height of image on screen with control lever at the bottom of projector in the right-hand side.

13. Inserting the next slide or pushing the empty frame into position will automatically return the previous slide.

14. Present slides smoothly.

15. After showing, place projector in case by reversing procedure and return it to storage.

"Automatic" slide projection. When a series of 2 by 2-inch slides are to be exhibited to a group, it is convenient to use an "automatic" projector such as the Golde Nu-Manumatic Slide Projector, the Selectroslide, or the Kodaslide Ready-Mount Changer. This equipment makes it possible to insert 20 to 50 slides in a carrier, and then to feed them automatically into the projector by means of a cable release or a remote push-button control. The Kodaslide Changer is especially designed for paper slides and will not handle glass slides. For most satisfactory results, carefully follow the instructions which accompany the projector.

Faxfilm slide projection. Faxfilm provides a simple and economical method for reproducing surface finishes and contours in the third dimension. Surface roughness, waviness, grains, cleavages, cracks, porosity, dents, and scratches may be enlarged 10,000 times, or 100 diameters by projecting a Faxfilm slide in any 2 by 2-inch slide projector. If the slide is carefully made, it will show details of the finest irregularities up to .0001 of an inch.

A Faxfilm slide can be prepared in a few minutes, simply by moistening the surface of the specimen with Faxfilm solution and

carefully placing an inch piece of Faxfilm plastic ribbon on it. After drying, it is peeled from the surface of the specimen, placed in a 2 by 2-inch cardboard frame, and is ready for projection. A kit containing material for 250 slides may be purchased for approximately $15.00. Sources are listed in Appendix II.

Flashmeter slide projection. The Flashmeter makes it possible to flash words, phrases, sentences, or pictures on a screen for definite time periods, ranging from $\frac{1}{75}$ of a second to a full second. It is especially applicable in diagnostic and remedial procedures in reading, speech, spelling, arithmetic, and recognition training. The Keystone View Company has developed a large variety of slides suitable for use with the Flashmeter. However, an instructor can also prepare his own simple slides for use in specific training jobs. The Flashmeter unit can be attached to the lens barrel of an ordinary standard lantern projector, and it may be purchased for approximately $67.00 from the Keystone View Company.

Micro-slide projection. By using a simple microprojector, as that developed by the Bausch & Lomb Company, it is possible to project a large variety of microscopic slides with a magnification of 120 diameters at 20 feet or 180 diameters at 30 feet. Many trainees in chemistry, physics, and other science classes have difficulty in studying a slide under a microscope. However, with the use of a microslide projector, the instructor is able clearly to show the entire group exactly what to look for in the slide. The microprojector unit fastens to the front of a projection lens and microscopic slides of fibers, textiles, flowers, insects, plant stems, and other subjects are held in place by a set of spring clamps.

Stress and strain on fibers and filaments, surface tension phenomena in aqueous and other solutions, crystal growth in solutions, close study of fingerprints and numerous other investigations may be adequately facilitated by the use of microprojection. A microprojection unit may be purchased from the Bausch & Lomb Company for approximately $20.00.

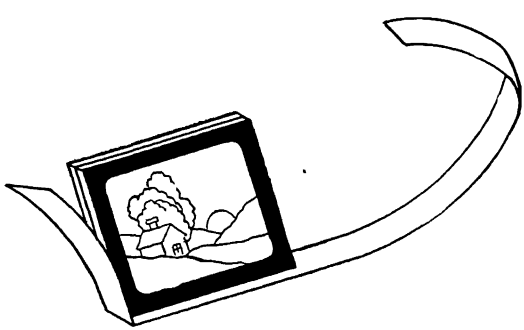
Miscellaneous hints. A good instructor will make certain that there is sufficient extension cord, plugs, and an extra projector lamp. If you are using an assistant, arrange a simple signal system with him. The more professional you make your presentation the more effectively will you be able to instruct.

Projectors are delicate instruments, requiring occasional repairs and replacements, and continual oiling and cleaning. Follow the manufacturer's instructions. Take care of your projector and it will not let you down.

How to Make Slides

The standard 3¼ by 4-inch slide. These training slides can be made with (1) cellophane, (2) etched glass, (3) plain glass, (4) lumarith (5) silhouettes, and (6) photographic prints. Most of this material may be purchased in your local photography and stationery stores.

Only the preparation of the photographic slide requires special ability, and unless you have access to a dark room and have tinkered with photographic development, it would be advisable, and less expensive, to borrow, rent, or purchase these slides from reliable sources listed in the Appendix. A black-and-white slide costs approximately fifty cents, and a hand-colored one may be purchased for one dollar and fifty cents. For complete information on how to prepare photographic slides, use the "Kodak Data Book on Slides." [4]



The other training slides are easy to make. Constructing slides is an excellent training device for the learner, but the time allowed for this task should be budgeted. The instructor will find it extremely valuable himself to prepare the slides that accompany his training plans.

Binding slides. All permanent slides should be made with two pieces of glass, held tightly together with binding tape. A roll of standard binding tape for fifty slides may be purchased for twenty cents. Ordinary scotch tape may also be used. Follow these directions for binding slides:

1. Cut off 15 inches of binding tape.
2. Place tape upon a flat surface with adhesive side on top.

[4] Published by Eastman Kodak Company, Rochester, N. Y. Available at most local photography stores.

3. Moisten tape (if necessary).

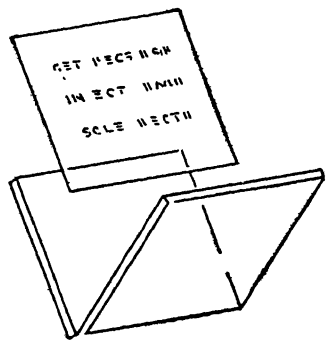
4. Holding the two pieces of glass firmly with all edges even, set one side in the center of the tape, starting at one end.

5. With firm pressure, roll the slide along the tape until all edges are covered.

6. Press down the edges of the tape on both sides of the glass.

7. Make corners even by folding one side under and the other side over.

Cellophane slides. The material required to make this type of slide consists of:



1. A 3½ by 4-inch sheet of plain or colored cellophane.
2. A 6½ by 8-inch sheet of carbon paper.
3. Two pieces of 3¼ by 4-inch cover glass.
4. 15 inches of binding tape.
5. A typewriter.

Before starting your good copy, lay out the slide on a 3¼ by 4-inch piece of scrap paper. Be sure to leave a ½-inch margin on all sides. Follow these steps:

1. Fold sheet of carbon in half, and place cellophane in center.
2. Insert carbon and cellophane in typewriter and adjust machine for stencil position.
3. Type material on cellophane through the carbon. Using a ½-inch margin, you can have 13 single-space lines with approximately 33 spaces to a line.
4. Remove cellophane and place it between two pieces of cover glass.
5. Secure glass covers with binding tape.
6. With slide in correct reading position, place a thumb mark in lower left-hand corner.

If a Radio-Mat slide is used, it is merely necessary to insert it in the typewriter, mat side toward the operator, and after completion, remove the envelop back and the carbon sheet. The 3¼ by 4-inch slides may be purchased for approximately $1.50 per 100 and the 2 by 2½-inch slides cost approximately $2.00 per 100.

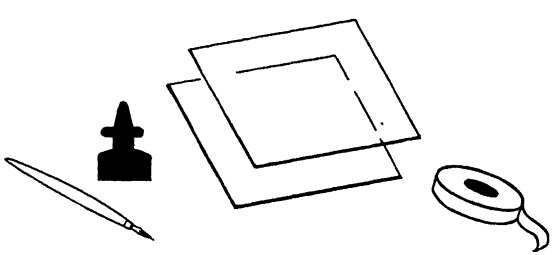
Instead of using a typewriter, you can write on the cellophane through the carbon with a stylus. India ink may be applied directly to the cellophane with a fine or medium pen, in which case it is suggested that you place the cellophane over the drawing or sketch, and merely trace it on the transparency.

Etched glass slides. Etched glass used for this purpose is nothing more than a fine piece of glass with a roughened surface that will readily take India ink, colored slide inks and pencils, slide crayons, and the ordinary lead pencil. You may purchase 3¼ by 4-inch pieces of etched glass for approximately ten cents each.

The necessary material to construct this slide consists of (1) one piece of 3¼ by 4-inch etched glass, (2) one piece of 3¼ by 4-inch plain glass cover, (3) colored slide pencil, and (4) 15 inches of binding tape. If you use ink, experiment with pens until you find the point and position that suits you best. Follow these steps:

1. Prepare material on a 3¼ by 4-inch sheet of paper, leaving a half-inch margin on all sides.
2. Place the etched glass over the sheet of paper, and trace the material on the roughened surface with colored pencil. If ink is used, apply it lightly to prevent it from cracking when it dries.
3. Place a plain glass cover over the etched glass.
4. Secure both pieces of glass with binding tape.
5. With slide in correct reading position, place a thumb mark in the lower left-hand corner.

Slight errors on a slide become greatly magnified when projected on a screen. Lead-pencil markings may be removed with art gum. "Ketch" will remove colored crayon and pencil marks, and a slide ink solvent will remove ink markings. If the finished slide is not satisfactory, do not discard it, but clean the surface and start over again. To remove crayon and pencil material, use soap cleanser and water.



Plain glass slides. To prepare these slides you need (1) two pieces of 3¼ by 4-inch cover glass, (2) India ink, (3) pen, and (4)

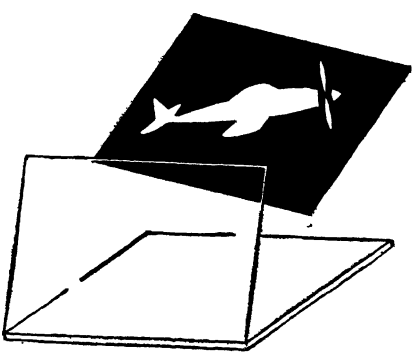
15 inches of binding tape. Good cover glasses may be purchased for approximately two and one-half cents each. However, it is necessary to clean the surface thoroughly before the cover glasses will take India ink. Cleaning fluid, alcohol, carbon tetrachloride, or soap and water, will be satisfactory. Use a linen cloth or a chamois for drying the slide.

Other methods of preparing the slide to take colored ink and pencil as well as India ink are to (1) paint surface with a light coat of clear shellac, (2) cover surface with a solution of one-quarter teaspoon of gelatin or glue dissolved in one ounce of hot water, or (3) place slide in "hypo" solution and wash in water for three or four minutes. Cover glasses thus treated must be allowed to dry in a place free from dust.



After one glass cover is prepared, follow the same procedure suggested for an etched glass slide.

Lumarith slides. This safety celluloid is made in clear and etched sheets, usually 20 by 50 inches. The economy of lumarith has contributed greatly to its widespread use. A sheet will yield approximately seventy-five 3¼ by 4-inch pieces and costs one dollar and twenty cents.[5] The clear celluloid takes the place of plain glass, and the etched lumarith may be used instead of etched glass. Follow the same procedure in preparing lumarith slides that you do in making plain glass and etched slides. To make your slide completely permanent, insert celluloid between two pieces of cover glass, as you do with cellophane.

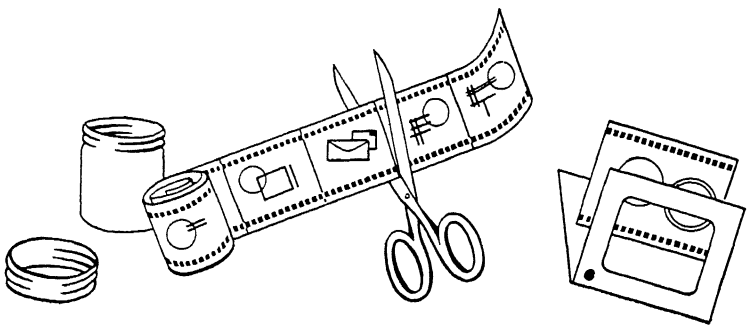


Silhouette slides. These slides are popular with youngsters in elementary schools; nevertheless they can be valuable in other kinds of training, especially in subjects where the effect of size or area is important. Silhouette effects can be made either by cutting out an object and placing it

[5] Celluloid Corporation, Newark, N. J.

between two pieces of cover glass or by placing the paper from which the object has been cut between the glass covers. Using colored cellophane with these cutouts will produce interesting results.

Two- by 2-inch slides. These slides are playing an important role in all areas of training, chiefly because they can be made to pertain to specific things. Secondly, the ease with which these



slides can be prepared makes it possible for any instructor or personnel trainee to produce excellent slides with a little practice. Thirdly, they are inexpensive.

Thirty-six exposures of 35 mm. black-and-white film may be purchased for approximately one dollar. Eighteen exposures of 35 mm. Kodachrome (color) film cost approximately two dollars and fifty cents. However, this includes processing and they are returned to you mounted in slide form. The price of film is usually much less when purchased in larger quantities.

A 35-mm. or bantam camera, such as the Argus, Contax, Eastman, Exakta, Leica, Welti, and Zeiss, is necessary. They range in price from ten dollars to five hundred dollars and more. However, it is not always the most expensive camera that takes the best picture. Excellent results have been obtained with inexpensive cameras.

Black-and-white slides. Indoor and outdoor transparencies of this type are made with black-and-white film. A "faster" film, such as Kodak Super-XX or Kodak Plus-X, is excellent for indoor work, while a "slower" film, such as Kodak Panatomic-X, may be used for outdoor work. Follow the directions which accompany the film for best results. When doing indoor work, special attention must be given to the lighting requirements: use photoflood

lamps No. 1 or No. 2 as directed. Using a light meter will assure accurate exposures, although this is not necessary. After exposing and developing ordinary black-and-white film, select the negatives which you want converted to positives for slide use. Kodak Direct Positive Panchromatic Film (36-exposure costs approximately $1.30), when exposed in a camera, will yield a direct positive for the slide instead of the usual negative.

Kodachrome (colored) slides. The natural color of both outdoor and indoor settings is captured with 35 mm. Kodachrome film. Regular Kodachrome-K135 is used for outdoor scenes, while Type A, Kodachrome-K135a is used for indoor work and may be used outdoors if a type A Kodachrome Filter for Daylight is attached to the camera. For satisfactory results, follow the directions which accompany the film. Proper lighting is of utmost importance in colored photography, especially when doing indoor work with artificial light. Ordinary photoflood lamps No. 1 and No. 2 or photoflash illumination should be used instead of blue bulbs or arc lamps.

Exposure for Kodachrome film. The Eastman Kodak Company suggests the following procedures for exposure and lighting for Kodachrome Type A film:

1. Load and unload your camera in subdued light. Retain the container in which the magazine was packed, and use it for sending the film to the processing station.
2. After the last picture has been made, rewind the film into the magazine; this will prevent any possibility of winding the film too far and tearing it loose from the supply spool.
3. A tripod or some other rigid support for the camera is required for exposures longer than $\frac{1}{25}$ second.
4. The Exposure Table for Photoflood Lamps on page 48 is for flesh tones or for subjects of average color. For dark-colored subjects, use the next half-stop larger; for light-colored subjects, use the next half-stop smaller.
5. The light from all Kodak Handy Reflectors must be superimposed on the subject. This restricts the area that can be illuminated successfully by a few photoflood lamps.
6. Do not use more than six No. 1 photoflood lamps or three No. 2 photoflood lamps on a single fused circuit.
7. When you use an exposure meter, much more care is required

with Kodachrome film than with films for black-and-white pictures. For further information refer to booklet "Full Color Kodachrome." [6]

Arrangement of photoflood lights. Photoflood lights for slide making are an important aspect of the job. Here is how flood lights are operated:

1. Front lighting is important. Keep the lights near the camera axis, which is an imaginary line from the camera lens to the subject. Deep shadows should be avoided.

2. The Kodak Handy Reflectors should be placed on each side of the camera axis. No part of the reflectors should show in the finder of the camera.

3. At least half of the lights should be somewhat higher than the subject, whereas the rest should be at camera height to illuminate the shadows.

4. Daylight should be excluded; otherwise the pictures will be too blue.

The following indoor exposure table should be used to assure satisfactory results.

INDOOR EXPOSURE TABLE
WITH NO. 1 PHOTOFLOOD LAMPS* IN KODAK HANDY REFLECTORS

Shutter Speed in Seconds	*Number of Lamps*	*Distance from Lamps to Subject (No. 1 Photoflood Lamps)*					
		f/1.9 or *f*/2	*f*/2.8	*f*/4	*f*/4.5	*f*/5.6	*f*/6.3
1/25	1	4 ft.	3 ft.				
	2	6 ft.	4 ft.	3 ft.			
	3	7 ft.	5 ft.	3½ ft.	3¼ ft.		
	4	8 ft.	6 ft.	4 ft.	3¾ ft.	3 ft.	
1/5	1	9 ft.	6½ ft.	4½ ft.		3¼ ft.	
	2	13 ft.	9½ ft.	6½ ft.		4¾ ft.	
	3	16 ft.	11½ ft.	8 ft.		5½ ft.	
	4	19 ft.	13 ft.	9½ ft.		6½ ft.	
1	1	21 ft.	15 ft.	10 ft.	9 ft.	7½ ft.	6½ ft.
	2	30 ft.	21 ft.	15 ft.	13 ft.	10 ft.	9½ ft.
	3	37 ft.	26 ft.	18 ft.	16 ft.	13 ft.	11½ ft.
	4	42 ft.	31 ft.	21 ft.	19 ft.	15 ft.	13 ft.

* With No. 2 Photoflood Lamps the distances in the above table should be multiplied by 1¼.

Example. If the correct distance with No. 1 lamps is 4 feet, with No. 2 lamps this distance should be 4 × 1¼ = 5 feet.

[6] Eastman Kodak Company, Rochester, N. Y. Obtainable at most local photography stores.

Use of photoflash lamps. The following table gives guide exposure numbers for use with Mazda photoflash lamps when flashed in an average synchronizer reflector, or for the No. 22 photoflash lamp in the Kodak Handy Reflector:

	SM	No. 5	No. 11	No. 22
Open*	50	90	100	145
1/100	50	75	80	115
1/200	35	60	65	90

* These guide exposure numbers should be used when the shutter is set for time or bulb exposure or an exposure of 1/50 second or any exposure slower than 1/50 second.

To obtain the proper f/ number, divide the guide exposure number by the distance, in feet, from lamp to subject. The answer is the recommended stop exposures in rooms with light-colored walls and ceilings.

Example: When Kodachrome Type A Film is used on open flash (time, bulb, $\frac{1}{25}$, or $\frac{1}{50}$ second), the guide exposure number is 100 with the No. 11 lamp. If the lamp-to-subject distance is 9 feet, the correct f/ number of $100 \div 9 = f/11$; or at 6 feet, $100 \div 6 = f/16$.

For pictures taken outdoors at night, or indoors with dark-colored subjects or dark-colored surroundings, divide the guide exposure number by 2.

Caution: Under certain conditions, the glass bulb may crack or shatter when flashed. Therefore, it is recommended that a protecting transparent plastic screen be used over the front of the photoflash reflector. Do not flash in an explosive atmosphere.

"Shooting" the picture. The following steps should be followed when "shooting" pictures for black-and-white or Kodachrome slides:

1. Insert film in camera.
2. Clean lens with tissue.
3. Determine object.
4. Sight object in view finder.
5. Set camera in accordance with manufacturer's directions.
6. Check shutter speed.
7. Check distance.
8. Check diaphragm opening.
9. Keep your eye on the finder when "shooting."
10. Release trigger with a steady pressure.

1237823

Owing to variations in cameras and the type of film used, you should refer to the manufacturer's instructions for more technical information. If you do not have the original directions which accompanied your camera, do not hesitate to write for specific instructions.

For more information on producing slides refer to *Kodak Data Book on Slides* and *Visual Teaching and Kodaslides.*[7]

Example of Content of Home-Made Slides

The uses to which these slides can be put are limited only by the imagination and initiative of the instructor and his trainees. The following are suggested areas that may be visualized through the use of slides:

1. Manufacturing processes
2. Processing merchandise
3. Transportation
4. Military training
5. Advertising
6. Agriculture
7. Business organization
8. Office training
9. Salesmanship
10. Health
11. Accounting
12. Art
13. Home Economics
14. Physics
15. Chemistry
16. Science
17. Retailing
18. Languages
19. Mathematics
20. Geography
21. Training methods
22. Credits and collections
23. Marketing
24. Religious events

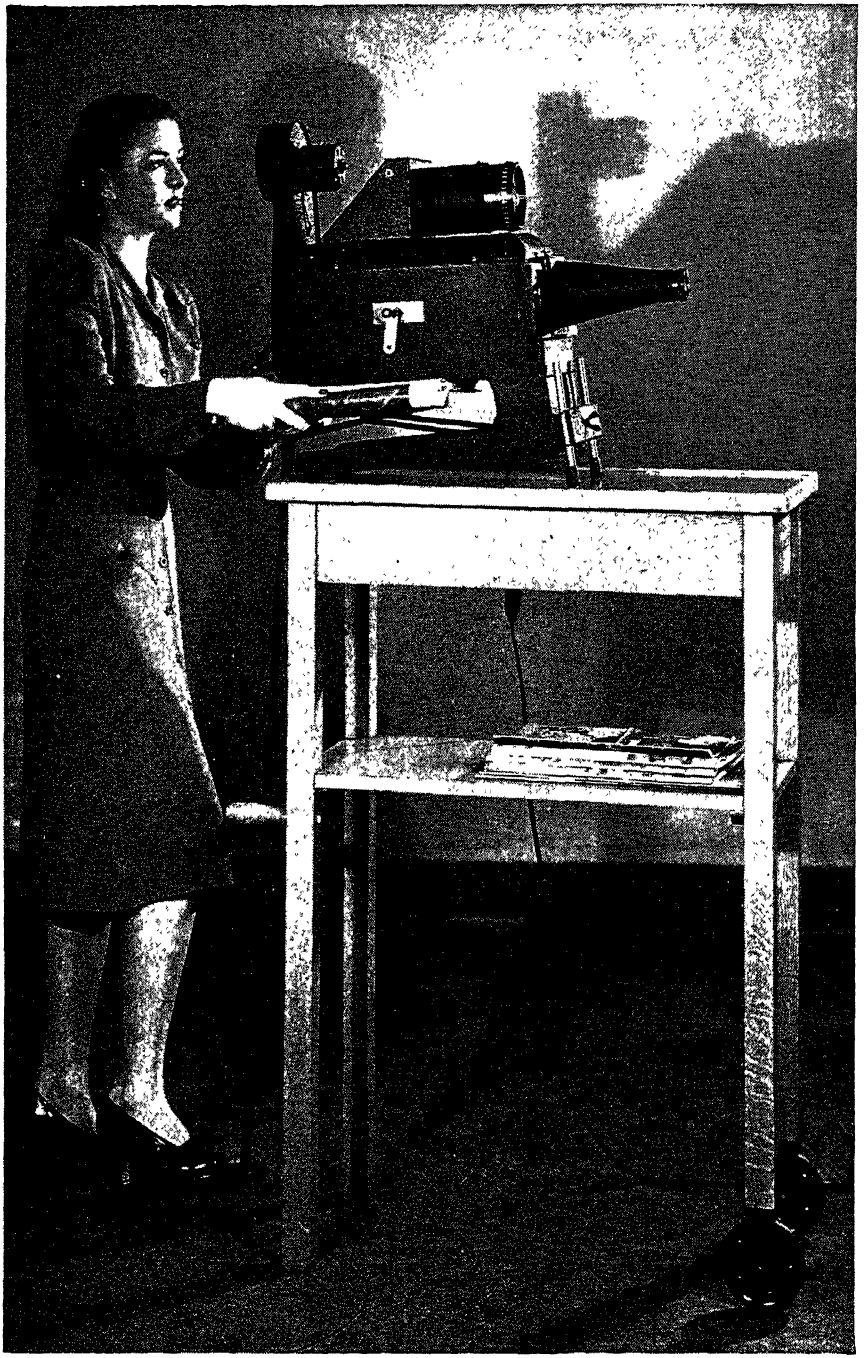
Trainee talks. Permit a trainee to develop his own slide pertaining to a job problem, and let him present it to the group with an interesting talk. You will be pleased with the results, since such a procedure often encourages self-conscious but otherwise excellent trainees to overcome their shyness, inasmuch as the attention of the audience is focused on the slide.

DO's for Using Slides

DO determine the right spot for slides in the training plan.
DO determine the correct slides.
DO secure slide catalogues.
DO arrange slides in proper showing order with the thumbmark in the upper right-hand corner.
DO focus projector and set up screen before group convenes.
DO have extra projector lamp, plugs, and extension cord available.
DO check seating arrangement.

[7] Eastman Kodak Company, Rochester, N. Y. Obtainable at most local photography stores and cost approximately 25 cents each.

DO check ventilation.
DO prepare trainees before presenting slides.
DO present slides in a psychological and orderly fashion.
DO leave image on screen long enough to permit trainee study.
DO use a pointer to focus attention on specific points in the picture.
DO use slides in connection with other visual aids.
DO apply slide information as soon as possible.
DO test trainee's understanding.
DO reshow slides if necessary.
DO arrange an adequate signal if using a projector operator.
DO make your own slides for specific job problems.



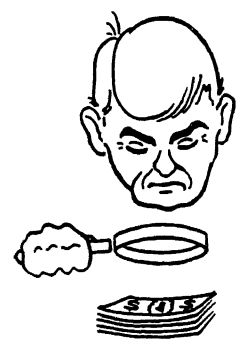
Courtesy of American Optical Co.

USING OPAQUE PROJECTOR TO SHOW ENLARGED ILLUSTRATIONS, PRINTED MATTER, AND SMALL OBJECTS.



Opaque Projector

SO YOU WANT to become a counterfeiter? Can you imagine being able to reproduce millions of dollars worth of material merely by placing the object in an opaque projector? Unlike counterfeits, these reproductions are much larger, more beautiful, and more effective than they were originally. To top it all, the opaque projector is the simplest and least expensive of all large projectors. A reliable machine may be purchased for approximately one hundred dollars, while a combined slide and opaque projector costs approximately one hundred and forty dollars.



The use of home-made materials in the opaque projector has a tendency to (1) stimulate attention, (2) arouse interest, (3) clarify information, and (4) makes trainees retain knowledge for a longer period of time. It can also be used to (1) introduce subjects or topics, (2) present specific information, (3) test knowledge and ability, and (4) review training presentation.

Sources of Pictures for Opaque Projector

An enormous amount of free and inexpensive material is available for use in this projector. Transparency is not necessary. Any picture, photograph, cartoon, drawing, magazine illustration, testbook page, fabrics, and other small objects may be used. Flat pictures, for example, may be purchased ready-mounted or they

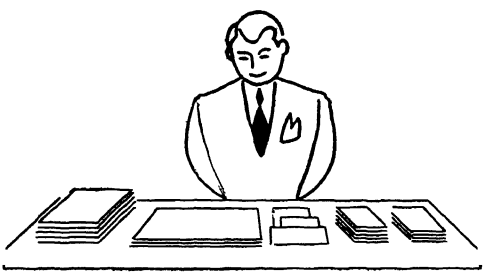
may be mounted by the instructor. It is simple for the instructor to develop a comprehensive list of illustrations on any subject.

Opaque projectors such as the Balopticon and the Delineoscope make it possible to present 6″ × 6″ and in some cases 8½″ × 11½″ or larger areas of flat objects on a screen, without the necessity of making slides or films.

The daily newspaper and the many popular magazines will supply you with a wealth of materials. Business, agriculture, industry—all have trade journals and other publications. Each publication has myriads of illustrations of all kinds and for every need. Only a little research will enable the instructor or personnel trainer to have these illustrations in his training department.

How to Use the Opaque Projector

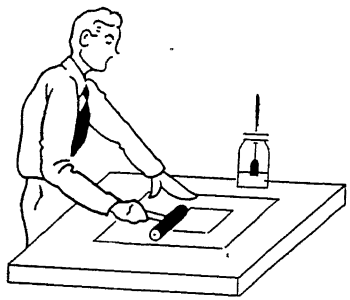
Select proper material. Selecting the right materials for the right training situation will assure successful training. An instructor who is thoroughly acquainted with his training problems will be on the continual look-out for effective material. If complete units of illustrations or individual pictures have been constructed for specific job problems, the instructor will find it helpful to note this information in the visual aid column of his training plan. As new training material is added to your collection, revise and bring your plan up to date. Do not hesitate to replace worn or out-dated illustrations with newer and better pictures.



Prepare materials for use. A large magazine, a section of a newspaper, a textbook, a sales slip, a small electrical appliance, the sleeve of a coat, and many other similar items may be used without special preparation. Anything placed in the 6 by 6-inch opening can be projected on the screen. However, in order to build a permanent collection, it is advisable to mount your material. Mounted material may be (1) stored more easily, (2) filed more adequately, and (3) located more rapidly.

Mounting individual pictures for the opaque projector. The following simple steps indicate all that is necessary for mounting pictures to be used in the opaque projector:

1. If possible, select illustrations which are 6 by 6 inches or smaller.



2. Select a medium weight mounting cardboard.

3. Neutral colors are satisfactory, but for more dramatic effect use colored backgrounds which blend with the picture.

4. Cut cardboard to same shape as platon, which is usually 8 by 8 inches. Allow an extra inch, or a small thumb space, on the right-hand side for filing index information and ease in handling.

5. Cut pictures straight, and mount them evenly and smoothly on the cardboard.

6. Center picture on cardboard, allowing for the extra space on the right-hand side. Remember the illustration is inverted when placed in projector.

7. Cover the entire back of picture with adhesive tape.

8. Carefully press picture to the mount, working from top to bottom.

9. If desirable, place brief title or explanation on mount.

10. Place job classification and other filing information in space on the right-hand side.

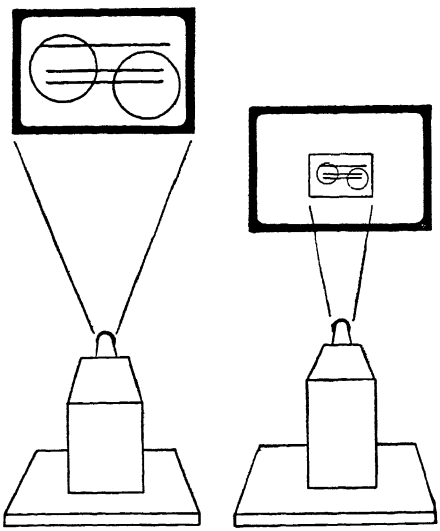


Check all physical features. All physical features must be checked prior to showing illustrations. The following physical features need specific inspection:

1. *Arrange material in proper showing order.* Before the group convenes, collect all of your material and arrange it in the proper showing order. Stack the pictures on the right-hand side of the machine, face up and inverted. This is the position the material

has in the projector and correct placement of materials facilitates their use when the training room is darkened.

2. *Set up projector and screen.* Unless the opaque projector and screen are permanent fixtures in the training room, it will be necessary to set up the equipment before the group meets. If possible, place the projector on a 4-inch stand to avoid obstructing the light ray. The size of the screen and the focal length of the projector lens should also be considered in determining the distance between the screen and the projector. It is easier to use the following table than to lug your projector and screen back and forth to find the correct distance.



A smaller, but brighter, image may be obtained by shortening the distance between the projector and screen. This is a desirable procedure in rooms which are difficult to darken properly.

3. *Check seating arrangement.* For good vision, the trainee should sit within the space formed by a 60-degree angle. Leave several feet of vacant space between the first row of trainees and the screen. If the projector is not high enough for the light ray to pass over the heads of the seated trainees, leave a vacant space between the projector and screen.

FOR OPAQUE OBJECTS, 6 × 6-INCH OPENING

Focus of Lens in Inches	*Distance from Lantern to Screen*						
	15 ft.	20 ft.	25 ft.	30 ft.	35 ft.	40 ft.	45 ft.
14	6	8	10¼				
18	4½	6¼	7¾	9½	11		
25		4¼	5½	6¾	8	9	10¼

Example. A projector equipped with an 18-inch lens used at a distance of 30 feet from the screen will project a picture measuring 9½ feet wide.

4. *Check lighting.* The opaque projector, which depends upon a good mirror for reflection, may be used in a partially darkened

room. However, for obtaining best results, the training room should be darkened as much as possible. Prevent rays of light from falling directly on the screen or shining on the faces of the trainees. Test the electric outlet for the projector to make certain the power is on when the room lights are off.

5. *Check ventilation.* Sacrifice darkness for sufficient ventilation. To learn is difficult in a hot, stuffy room. Poor ventilation may be avoided either by using (1) an inexpensive "dark room" ventilator, (2) an ordinary electric fan, or (3) a portable cooling unit.

6. *Test projector.* Just before training time, turn on the projector. Insert your first picture and focus lens. To prevent mishap, have an extra lamp on hand. Turn off projector and have everything in readiness. When the time comes to exhibit your picture, turn off room lights and flash image on the screen.

Presenting materials with opaque projector. The use of the opaque projector is usually not a continuous procedure, but lends itself to the projection of a few pertinent illustrations at crucial moments in the training procedure. However, when a series of related pictures are being used, the procedure is very similar to the stripfilm and slide technique.

Observe the following steps for successful training in any area:

1. *Prepare the trainee.* Everyone knows that a sale can be made or lost by the manner in which the salesperson approaches the customer. This is also true in training situations. Regardless of your excellent plans, unless you prepare the trainee, most of your efforts will be wasted. Inform the trainee (1) how he will benefit by the training, (2) what to look for in the illustration, and (3) that his knowledge will be tested at the completion of the showing.

2. *Present picture and instructions.* Present each picture smoothly and in proper sequence. Briefly tell and show the important points in each illustration. If you are being assisted by an operator, stand beside the screen and use a pointer to direct attention. Encourage trainee discussion, but do not permit discussion to get out of hand or become lengthy. Stress all principal steps. Do not present more than the trainee can assimilate.

3. *Apply training.* Have the trainee apply the things learned as soon as possible. He should be able to explain each step. He

should have acquired and be able to employ proper technical terminology.

4. *Test trainee.* Test the trainee's knowledge. Best results are obtained when the trainee thinks the test results will be used to correct his errors. Objective questions, such as (1) true-false, (2) completion, (3) multiple choice, and (4) matching type, alleviates the tiresomeness which usually accompanies the essay-type test. Simple check sheets or quiz are very effective and may easily be graded. Check the trainee's performance and speed. Correct all errors.

5. *Review the instruction.* An excellent review of the instruction is obtained by briefly exhibiting the key illustrations without comment. If a series of pictures were used, it is merely necessary to reshow those which are pertinent. The errors made in the application and testing are a good indication of what to reshow. The final test of successful store training is: Can the trainee perform? Remember, *if the trainee cannot perform, the instructor has not taught.*

How to Operate the Opaque Projector

The opaque projector is bulky in appearance, but is easy to operate. It is necessary simply to (1) insert the material on the metal try or "platon", (2) push housing in place with lever, and (3) adjust the lens to bring image in sharp focus.

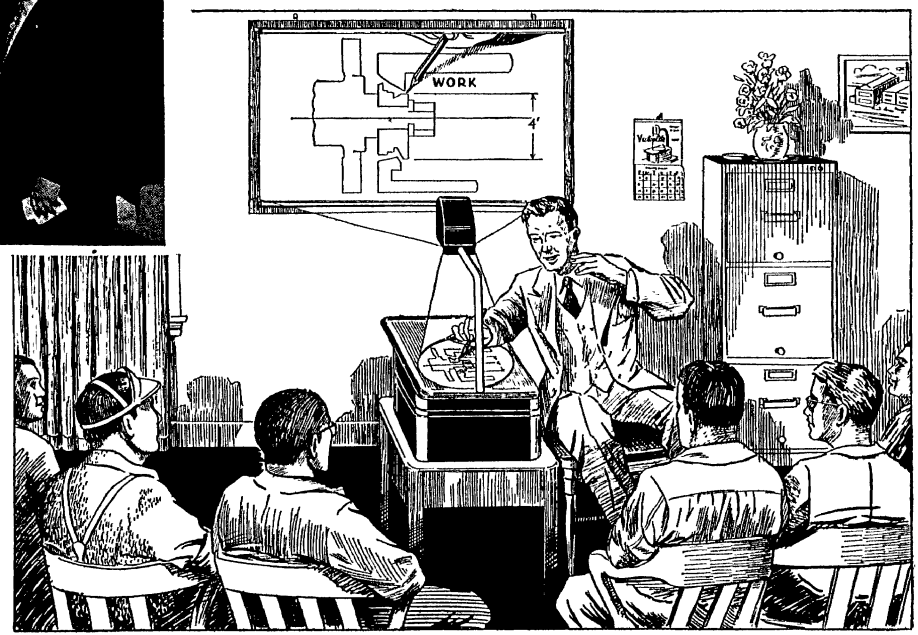
There are several combination models and special attachments for the opaque projector. In each case, the manufacturer's directions should be followed. However, *the following steps are basic for operating most models:*

1. Set up projector and insert plug in electric outlet.
2. Turn on lamp.
3. Turn on motor for cooling system.
4. Place picture on metal try or "platon" and bring housing into place with lever. The bottom of the picture should face the front of the machine.
5. Bring image to sharp focus by turning lens left or right.
6. If pictures are post-card size or smaller, use the card holder which is in the slot under the metal tray.
7. If using a newspaper, magazine, textbook, or actual merchandise, adjust the lens for each object. Turn blower to full speed.



Courtesy of Victorlite Industries

THE VISUAL CAST BEING DEMONSTRATED TO GROUP OF "KEY" EXECUTIVES.



THE VISUAL CAST PROJECTS AS THE TRAINER WRITES.

8. After showing material, turn off blower and projector lamp. Roll up extension cord, cover projector, and return the machine to storage after training group leaves.

How to Operate the Visual Cast

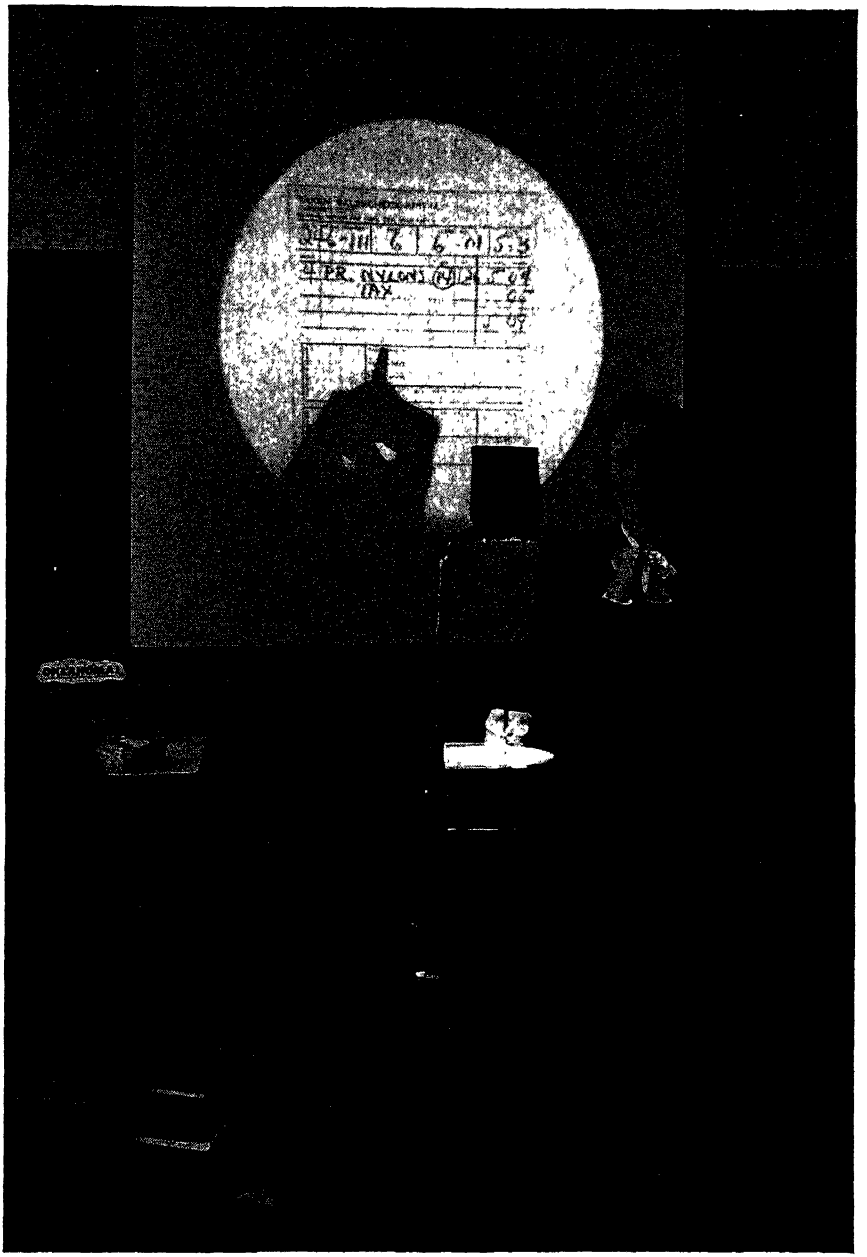
The Visual Cast projector is similar to the opaque projector in that a large number of items such as work sheets, charts, graphs, pictures, maps, diagrams, operational sheets, and saleschecks may be projected on a screen for group study and group participation. However, first it is necessary to have the material which is to be projected converted to transparencies by your local photographer or the Visual Cast Company. This is an inexpensive operation, and once a transparency is made, it may be used repeatedly. The instructor can write directly on the transparency with a chemical pencil as the transparency is being projected, and at the end of the training period, the pencil markings may be removed from the transparency by rubbing it with a clean cloth. A heavy sheet of ordinary cellophane may also be placed on the transparency, and the instructor can write directly on it.

Use the following simple procedure to operate the Visual Cast:

1. Set up the projector at the front of the room with the projector lens facing the wall, blackboard, or screen.
2. Turn on switch.
3. Place the transparency on the glass top with the right side up.
4. Adjust projector lens until image is in sharp focus.
5. When writing on the transparency, be careful not to obstruct the view with your hand.
6. After the training session, remove all pencil markings on the transparency with a clean cloth.

Setting up the Visual Cast. The screen should be located at a position in the room which is shadowed or shielded from direct illumination, either artificial or natural. Plenty of light should be provided for the room and trainees, but this light must not shine on the curtain.

The Visual Cast may be set upon a standard-height table if the instructor wishes to stand while teaching, or it may be placed so that the top of the lens table is approximately 30 inches from the floor for the instructor who wishes to be seated while training.



Courtesy of R. H. Macy and Co.

USING THE VISUAL CAST IN "SYSTEMS" TRAINING.

Victorlite manufactures special tables to accommodate either position with an area provided for using and storing the special Victorlite holder for use with Victorlite transparencies.

For best visibility by the audience, the bottom of the 6- × 6-foot screen should be approximately 4 feet from the floor. Under such conditions the top of the screen should be tilted forward about 10 inches, and the Visual Cast should be approximately 9 or 10 feet from the screen. To bring about this condition, it is sometimes necessary to rearrange the students' chairs, beginning as close to the back wall as possible with the first row of chairs. If the room is so large that the trainees in the back cannot see details in the screen picture, a much larger screen should be used, and the Visual Cast moved away from it to bring the picture to the full size of the screen. The pictures are framed to make them rectangular or square. It is, therefore, often possible to use the Visual Cast a little farther from the screen in order that the actual picture may fully cover the screen. Under this condition some light will spill around the screen when the framed picture is removed.

Selecting screen for Visual Cast. A mat finish screen is preferable for class rooms and provides visibility from wide angles. A beaded screen is recommended only in those cases in which the illumination in the room is very intense and is shining more or less directly upon the screen. A beaded screen loses its efficiency when viewed from one side and is therefore not practical for a wide classroom or when viewed from the sides and closeup. It is indispensable under unusual illumination conditions.

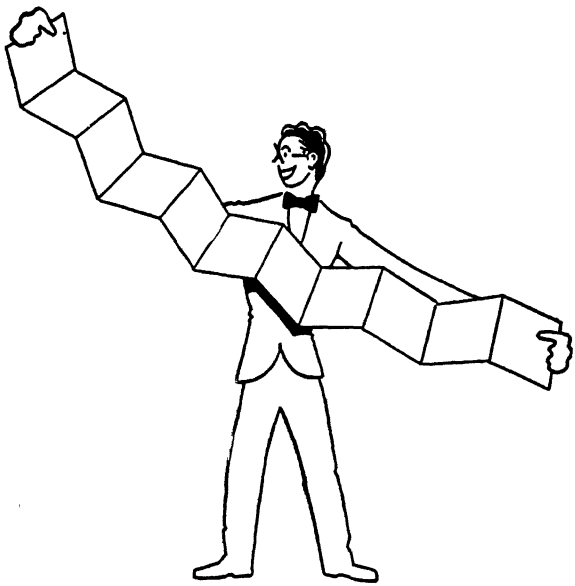
It is recommended that a screen at least 6 × 6 feet square be used for classrooms up to 40 feet wide.

How to Construct Illustrative Sets

How to make folded card sets. Related illustrations covering a complete segment of knowledge may be exhibited as a single unit. One method is to make a folded card set. This is done as follows:

1. Assemble a group of individually mounted pictures in the desired order. Use 8 by 8-inch mounts for folded card sets.
2. Lay out pictures on table in order, from right to left, facing you.
3. Attach each mount to next one with a piece of ¾ or 1-inch cloth, binding tape in the back.

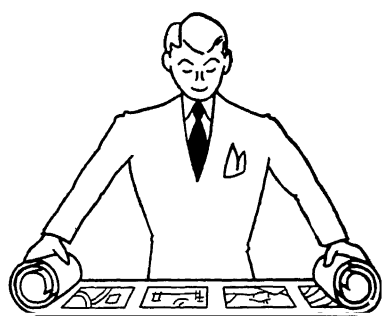
4. Leave a small space, about 1/16 or 1/8 inch, between mounts to allow for folding.



5. Place topic, unit or subject, and other identification on the back of the first mount to facilitate filing.

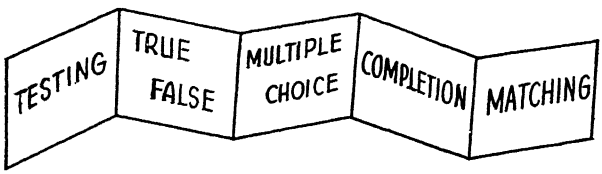
These pictures will fold into a small compact unit, and as each mount is pushed through the projector, it refolds in the same order.

How to make a rolled paper base. Another method for constructing a series of pictures is to make a rolled paper base as follows:



1. Arrange related illustrations in desired order.
2. Secure ordinary rolled wrapping paper or shelf paper and if necessary trim to an 8-inch width.
3. Paste materials in center of paper facing you, allowing 6 inches for each picture.
4. Work from right to left, and leave 1 inch between the picture space.
5. Roll the complete unit and keep intact with rubber band.
6. Identify material for filing on outside of roll.

An average job unit will require about 8 or 10 feet of rolled paper, which is sufficient for twenty or more illustrations. After guiding the beginning of the roll through the machine, handle it like a scroll, unrolling the material as it goes in, and rolling it up as it comes out.



How to Test the Trainee

The opaque projector lends itself to several interesting and helpful testing procedures in training, which may be planned in the following ways:

1. An effective time saver is to prepare the test on a suitable mount, and to project it on the screen at the proper occasion. It is also possible to prepare the correct answers on similar mounts and permit the trainee to check his own test by projecting the answers on the screen. Unless it becomes necessary to revise the test, it may be used in successive training groups.

2. Another method for using the opaque projector in testing is to project a picture with a brief question concerning it. A simple multiple choice or completion question may be placed directly beneath the illustration. The correct answers can be prepared in an accompanying set.

3. The short-exposure technique may also be used to good advantage in testing, in which case the paper roll base will be best. The paper roll base is prepared so that after the question is projected, the paper can be moved until a black space appears on the screen, and when moved a little more, the correct answer will appear.

For most projectors, it will be necessary to leave about 6½ inches between the question and the answer. You can avoid leaving this space by placing a sheet of white paper over the question. White paper is best because it reflects a brilliant white light on the screen.

Objective questions, such as the true-false, completion, multiple choice, and matching type should be used exclusively. The answers

may be oral or written. Make your exposures as brief as possible. The possibilities in this type of testing are unlimited.

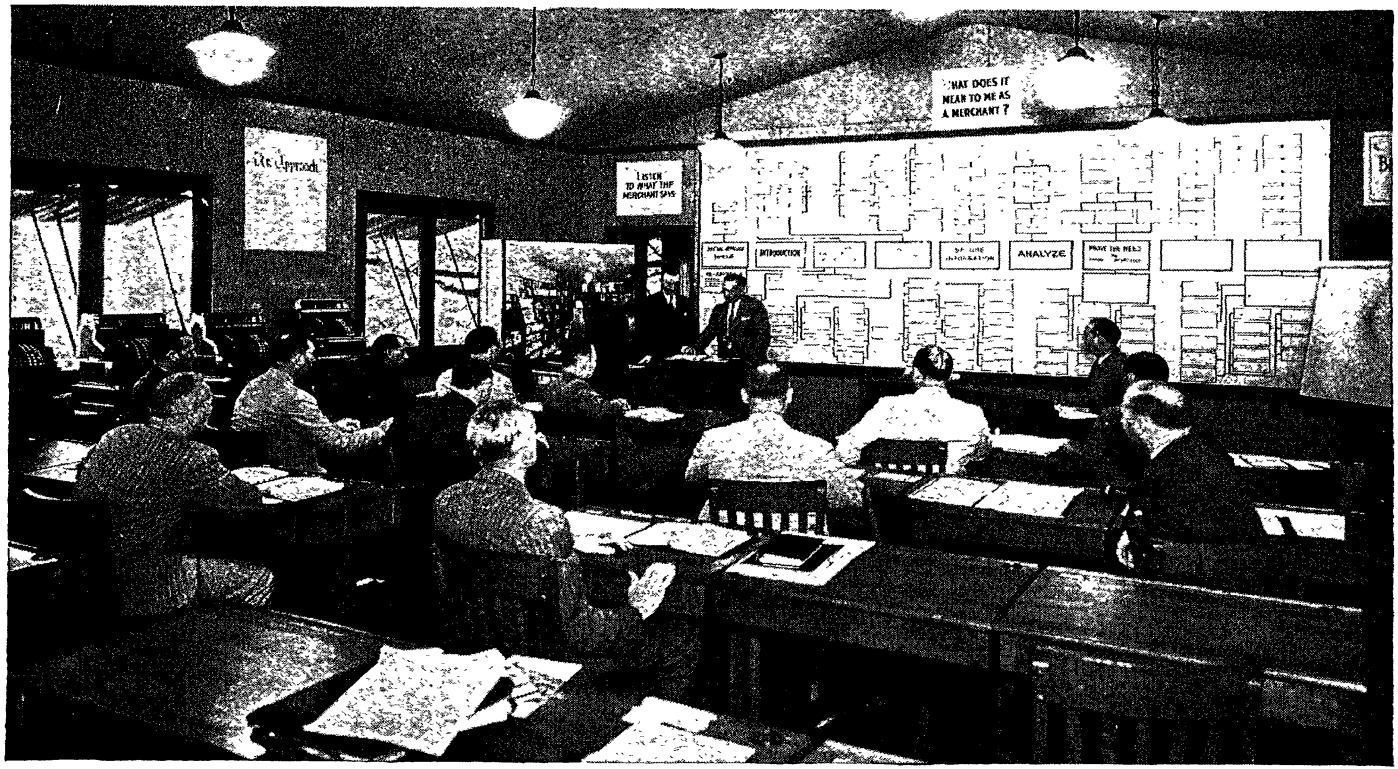
How to Classify and File Material for Use in Opaque Projectors



All training material for the opaque projector should be classified and filed for future use. In order to save time and effort, devote a section of your cabinet or file to this material. Several inexpensive letter files will serve the purpose. Arrange the material alphabetically, by job problems, by subject matter, or in any other effective manner.

DO's for Using the Opaque Projector

DO convert for projector use the unlimited amount of free and inexpensive training material.
DO select the right material for the right job.
DO mount your material.
DO keep material up-to-date.
DO arrange material in proper showing order.
DO set up projector and screen before group meets.
DO check seating.
DO check lighting.
DO check ventilation.
DO prepare trainee for observing illustration.
DO present pictures smoothly and in proper sequence.
DO apply training as soon as possible.
DO test trainee.
DO reshow key pictures.
DO follow manufacturer's directions for operating the projector.
DO turn on blower to high speed when projecting from test book, newspaper, or small objects.
DO prepare job problem sets.
DO use for job problem testing.
DO classify and file training material.



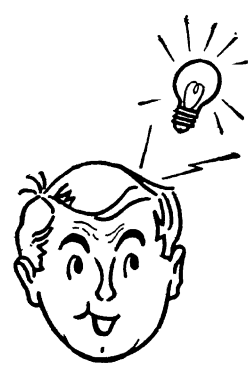
Courtesy of National Cash Register Co.

CLASSROOM SCENE AT SUGAR CAMP. NEW SALESMEN FOR CASH REGISTER AND ACCOUNTING MACHINE RECEIVE THEIR FIRST FORMAL NCR TRAINING AT SUGAR CAMP. IT IS ALSO USED FOR REFRESHER OR POST-GRADUATE COURSES OF SENIOR NCR SELLING MEN.



Maps, Charts, Graphs, and Diagrams

MAPS, CHARTS, GRAPHS, and diagrams have been named the "spark-plugs" of visual training because they are easy to make and are effective devices for personnel training. Extensively used in every type of industrial organization, by business concerns, in agriculture, and in many other types of job training, these instructional aids make dry and often meaningless facts more understandable and interesting. *They could be used more often.*



How to Prepare Maps for Training Purposes

You do not have to be a cartographer to make maps for training purposes.

Home-made maps are indispensable in the teaching of subjects too numerous to mention. For special purposes, maps usually must be made by the instructor. In addition to the home-made kinds, other useful maps may be obtained from various governmental bureaus, oil and railroad companies, and other concerns. Valuable maps, as well as charts, graphs, and diagrams, may be cut from magazines and newspapers and may be mounted, labeled, and filed for future use.

Preparing maps does not necessarily require artistic ability, but careful attention to a few simple rules will be worth while. *The successive steps of procedure are as follows:*

1. Make small pencil sketches of maps that will be useful in illustrating the job problem. Such maps may be made with soft pencil on small pieces of paper.

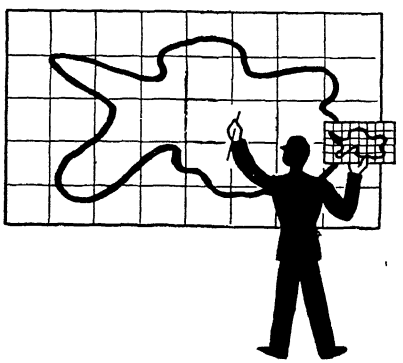
2. Decide which type of map will best clarify the ideas. Consider the possibilities of using charts, diagrams, or other visual aids.

3. Decide whether the selected visual aid is to be drawn in ink, crayon, or other media.

4. Become familiar with drawing materials and equipment.

5. Decide on the size of map needed for the training to be done.

How to enlarge a small sketch. A small sketch may be enlarged by proportional squares or by projection.



Enlarging by proportional squares.

1. Divide the vertical dimension of the small sketch into eight equal spaces. This can be done by folding the vertical edge into halves, then quarters, and then eighths.

2. With one of these spaces as a unit of measure, space off the horizontal dimensions.

3. Rule vertical and horizontal lines from the points obtained from the procedures in (1) and (2) above, dividing the entire sketch into squares.

4. Number these squares consecutively from left to right in the upper row, continuing in the same manner for the other seven rows.

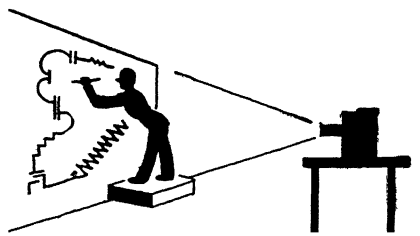
5. Fasten the required size paper on the drawing board or easel, leaving a margin of several inches on all sides. Wrapping paper can be readily procured and used, although drawing paper or cardboard will give much better results.

6. Divide the paper into the same number of squares as on the small sketch, leaving a 2-inch margin on all sides. A simple way of putting the squares on the large paper is with a piece of twine a foot or so longer than the drawing. Rub a light-colored chalk over the twine until the latter is thoroughly covered with chalk dust, which is accomplished easily if the twine is held taut. Stretch the twine between the upper left mark and the upper right mark, and snap the cord against the paper as a carpenter does a chalk line.

Continuing in this way, rule the entire paper into squares, numbering each to correspond with the squares on the small sketch.

7. Transfer the features from each square on the small map to the correspondingly numbered squares on the enlarged map as described below.

Enlarging by projection. If an opaque projector is available, much time can be saved and greater accuracy secured. By this device, the small sketch is projected directly onto the large paper. The distance between the projector and the paper must be adjusted until the image is the size wanted. It is then necessary only to sketch in pencil what is to appear on the map.



1. *Transfer of features.* Usually the best method is to transfer all features to the enlargement in pencil (using the proper scale), and then, before commencing to ink, to block out spaces for lettering.

It is a good idea to ink in the names first, but the instructor who is not familiar with the use of his pens will profit by getting practice on a piece of scrap before commencing to letter. A common error is to complete large objects first, then superimpose the names over the features. This results in unclear and untidy drawings.

Names, subjects, or titles should be printed within cleared space, so that a small white margin will be provided for each name. It may be necessary to use an arrow to indicate the exact location of the thing emphasized. When a special feature is to be emphasized, it is good practice to ink in this feature first so that all others can be subordinated to it. Whatever the procedure selected, provide spaces for names and reference data.

2. *Reference data legend.* On instructional maps or charts certain data should be shown: the name of the fact, topic, subject, or problem; the date; a simple unit of measure or scale; and a direction line. Such data may be placed in a separate, convenient place or in an unused area on the map. Often one corner can be set off for the legend. A border around the legend adds effectiveness to the total appearance.

3. *Inking in the features.* Colored inks may be used to plot

the various features: black for hand-made features—roads, towns, stores; brown for contouring; blue for water; and green for vegetation. Red ink is used principally for outstanding points.

4. *Inking in names and reference data.* Simple block letters are the easiest to make and are the most legible. Black is the conventional color.

5. *Size of the lettering.* For training rooms, lettering should not be smaller than 1½ inches in height. A letter under 1½ inches is difficult to see from the rear of most rooms. A 2½-inch letter is large. Lettering within this range can be used to emphasize the relative importance of the different features.

6. *Allowing ink to dry.* Probably one of the greatest sources of annoyance is the smearing of ink. It is advisable to ink in one complete feature at a time and let that dry thoroughly before puting in other details. Often instructors lose much time in removing ink smears because they commence to erase pencil and chalk marks before the ink is dry.

7. *Cleaning the enlargement.* The artgum eraser is used to remove pencil and chalk malks. In removing ink lines and smears, an ink eraser is often required, but white show-card color applied with a brush does the job faster. However, relining or lettering over show-card color requires expert experience, and is not recommended, since the ink smudges easily unless applied under certain conditions.

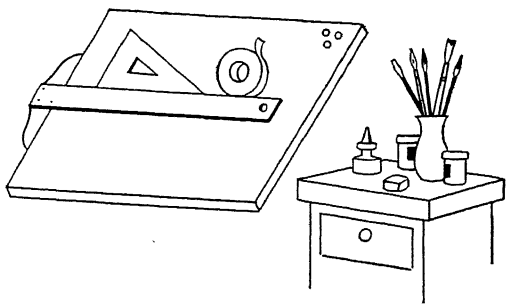
8. *Trimming the margin.* When a border is used, a margin of 2 to 3 inches is customarily left: this has the same effect as a frame on a picture.

9. *Movable symbols.* It will often be necessary to show movement on a map. By utilizing movable symbols which can be thumbtacked in proper place and moved as the situation develops, the trainee will follow the instructor's exposition. Effective is the use of movable arrows which can be tacked on a map to show points or locations which are under discussion. In short, by exercising ingenuity, an instructor, by the use of movable symbols, can vitalize what would otherwise be a dull map.

Equipment and materials for preparing maps. The following materials and equipment should be available in the visual aids section of every training center:

1. Drawing tables of the proper height, with large, smooth tops which can be adjusted to different angles.

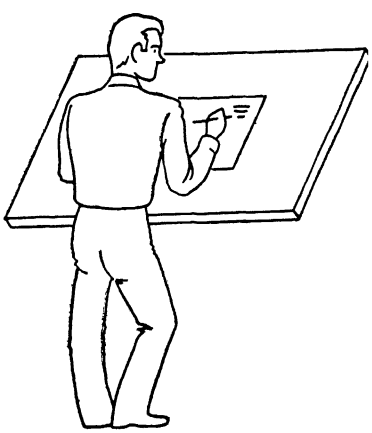
2. Light table with glass top lighted from beneath.
3. Drawing boards.
4. Draftsman's stools and chairs.
5. T-squares, triangles, and engineer and architect's scales.
6. Drawing instruments—compass, divider, and ruling pens.
7. India ink—black, blue, brown, red, and green.
8. Broad point and "speedball" pens.
9. Show-card or poster paint—red, green, blue, yellow, black, and white.
10. Camel's-hair and bristle brushes.
11. Artgum, kneaded, and ink erasers.
12. Ball of strong twine.
13. Cake of carpenter's chalk.



This equipment is inexpensive when purchased ready-made; some of it can be home-made. Time spent in getting the proper drawing equipment is time well used in increasing the efficiency of your training program.

How to Make Charts for Training Purposes

For instructional purposes, charts are used chiefly to analyze a problem or situation. They show proper sequence and relationship. The flow chart, table chart, and process or distribution chart, may adequately be used with many training problems.



Flow chart. A knowledge of the organization of a business, for example, may be of interest and importance to the trainee. The chart should show each division of the business and its break down into individual departments.

The trainee may be shown exactly where he fits into the picture. A personnel chart would start with the chief executive

and go down the line. The flow of power and responsibility must be clearly visible.

In making a flow chart the following suggestions should be observed.

1. Use squares, rectangles, or circles for each breakdown.
2. Use lines to show the flow or direction.
3. Lay out chart with ruler and pencil. Fill in with ink or crayon later.
4. Title and captions should be clearly visible.
5. Make chart large enough to be seen easily. Show cards 22 by 28 or 28 by 44 inches are suitable for most classroom purposes.

Table chart. The table chart is indispensable in many training situations. It is effective, for example, in presenting a breakdown of financial statements, such as the balance sheet or the profit and loss statement. It may also be used for comparisons or for listing advantages and disadvantages of a business or an organization.

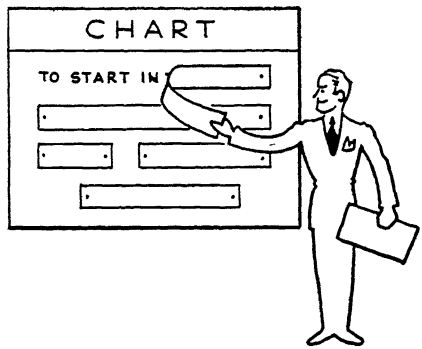
When making table charts the following suggestions should be helpful:

1. Lay out chart with straight columns.
2. Make similar comparisons or give advantages and disadvantages on the same level.
3. Use ruler and pencil. Later fill in with ink, crayon, or paint.
4. Use illustrations whenever possible.
5. Titles and captions should be clearly visible.
6. Keep chart neat and attractive.
7. Make chart large enough for good observation. Show cards 22 by 28 or 28 by 44 inches are suitable for most purposes.
8. Do not overcrowd chart.

The strip-tease chart. The "strip-tease" technique has been successful in Army training, especially when presenting a table chart. Each important point on the chart is covered with a thin strip of paper that can be easily removed at the proper time. A small piece of scotch tape may be used to keep the covering in place. Remove the covering dramatically with a flourish. This technique is very helpful in focusing attention on one point at a time in developing a subject.

Process or distribution charts. Process or distribution charts are especially applicable to many kinds of instruction. They may,

for example, illustrate the complete process of preparing a product for market or they may depict the channels of distribution of the various kinds of merchandise. Process or distribution charts are helpful aids in teaching subjects that deal with merchandise and agricultural products. The best sources for information are the individual makers or producers of the products. The Department of Agriculture, Department of Commerce, and other governmental agencies will also supply information dealing with processes or distribution for many kinds of enterprises.



The following general directions should be followed when process or distribution charts are made:

1. Present information in an original fashion.
2. Use illustrations whenever possible.
3. Make all titles and captions clearly visible.
4. Arrange all steps in proper sequence.
5. Use large sheets of paper or show cards large enough for each trainee to see.
6. Do not overcrowd.

How to Prepare Graphs for Training Purposes

Graphs are not only the language of statisticians, but are also effective tools for making comparisons and contrasts or for presenting complicated facts to trainees. A long column of statistics looks impressive, but is usually skipped over. However, an interesting graph on the same figures will arrest attention and make trainees stop, look, and think. Graphs which are involved or difficult to read are worthless. A good graph requires little explanation and tells its story at a glance.

Many instructional topics may be adequately presented with the bar graph, the "pie" graph, the line graph, and the pictorial graph.

The bar graph. The bar graph is easy to understand and simple to construct. It consists of bars arranged horizontally or vertically from a "zero" base. Size, length, or color of the bars rep-

resent the different values. Bar graphs are especially helpful in comparing or contrasting many subjects, such as quotas and sales, individual output, departmental production, and comparisons of income and wages.



Courtesy of National Dairy Council, Chicago, Ill.

USING BAR GRAPHS TO VISUALIZE FOOD VALUES.

The following suggestions for preparing bar graphs should be of practical value:

1. Work out the graph before doing the finished copy.
2. Use horizontal bars in preference to vertical ones.
3. Use a smooth surface sign card approximately 28 by 22 inches. If not available, ordinary brown wrapping paper will do.
4. Lay out graph with ruler and pencil. Fill in later with ink or crayon.
5. Leave ample space to the left of the zero line for all necessary printing.
6. Keep an even distance between bars.
7. Use vertical guide lines to facilitate reading the graph.
8. Number each guide line according to scale.
9. If using pictures, cartoons, or sketches, place them to the left of the zero line.
10. Use a brief, descriptive heading.

The "pie" graph. These graphs, as the name indicates, re-

semble a home-made apple pie. They are especially helpful where a "breakdown" or distribution of values is important, such as the growth of various areas, or store operating expenses. A statement or an example takes on added meaning when it is presented in the form of a "pie" graph. A vivid picture can be painted by coloring each section of the "pie" and placing the percentage number in each one.

Use the following suggestions for making a good "pie" graph:

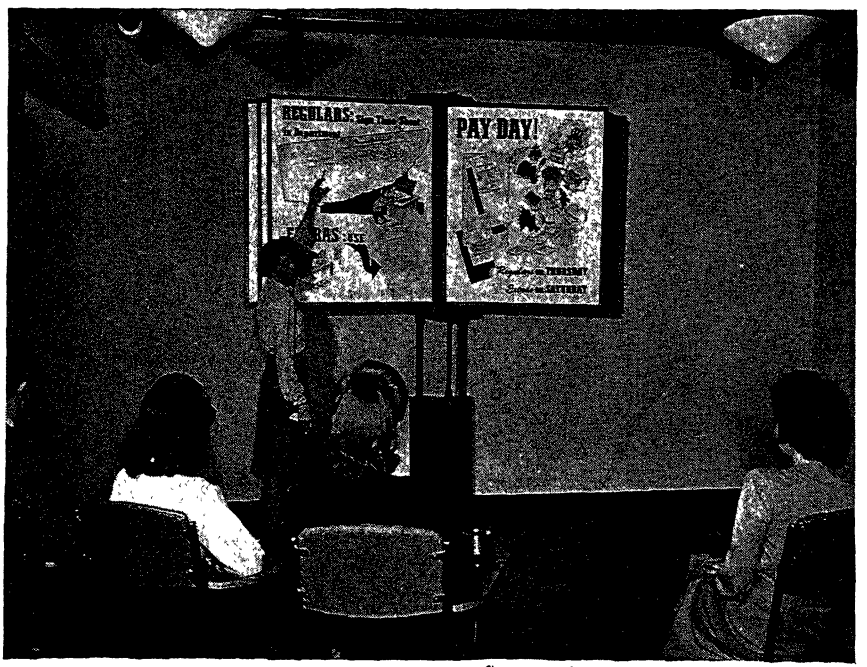
1. Work out the percentages for the pie before drawing the finished copy.
2. Use a compass with a pen or crayon attachment. A protractor would be helpful in laying out the circle and measuring the degrees.
3. Use a smooth surface sign card approximately 28 by 22 inches. If not available, use ordinary wrapping paper.
4. Keep printing in sections straight and neat.
5. If possible, place the percentage number in each section.
6. Color the sections to make the graph more interesting.
7. Use a brief descriptive title.

The line graph. This graph is commonly used in industry, agriculture, and business, and is especially helpful in depicting economic and business cycles and trends.

The following suggestions will help the beginner to prepare line graphs:

1. Lay out and determine the scale for the graph before preparing the finished copy.
2. Use an adequately sized sign card. If not available, ordinary paper may be used.
3. Lay out graph with ruler and sharp pencil or crayon. Ink may be applied later.
4. Use faint horizontal and vertical guide lines.
5. Number guide lines to the left of the zero line, and below the base line.
6. Also put descriptive printing to the left of the zero line or below the base line.
7. Plot line carefully. If more than one line is required, use different colors.
8. Use a brief descriptive title.

The pictorial graph. Because of its great popular appeal, the pictorial graph has become an outstanding method of graphic presentation. The complete story is told with illustrations. The number or size of the illustrations conveys the proportionate amounts. What the pictorial graph lacks in exactness it makes up



Courtesy of Stix, Baer, and Fuller, St. Louis

On the left: TEACHING NEW ASSOCIATES HOW TIME IS KEPT AT STIX, BAER, AND FULLER BY SHOWING BLOW-UP PICTURES OF TIME SHEET AND TIME CARD.

On the right: THE TWO MOST POPULAR DAYS IN THE STORE: THURSDAYS AND SATURDAYS—PAY DAYS.

BOTH CHARTS ARE CORRELATED WITH THE EXPLANATION OF TIME AND ITS RELATION TO PAY.

in effectiveness. Also, this graph is more difficult to make than the others, but the results are worth the effort. You may use pictorial graphs found in retail magazines, and individual pictures cut out of magazines and newspapers, or draw your own figures.

The following suggestions will be helpful in preparing pictorial graphs:

1. Determine the most effective medium for conveying the thought. Usually the medium can be the object itself, such as

money, a person, a farm, a building, a vehicle, or other illustrations.

2. Lay out graph, making the figure's proportions as accurate as possible.

3. Use a series of figures to obtain greater accuracy and to facilitate comparison.

4. Use magazine cut-outs only when they are in correct proportion.

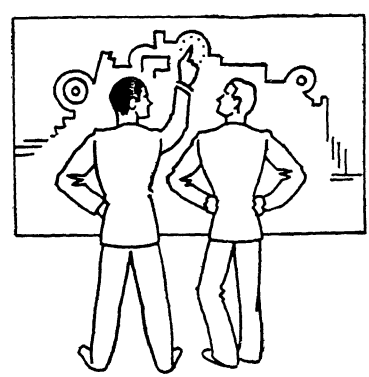
5. For extremely accurate work, have your local photographer prepare enlargements of your figure.

6. Place printing and percentages directly beneath the figures.

7. Use brief descriptive titles.

How to Make Diagrams for Training Purposes

A diagram may be nothing more than a line showing the progress of a product through an industrial plant, or it may be a highly technical drawing of thirty-story building construction or an illustration of how to operate certain appliances. Diagrams are becoming increasingly important in many kinds of training. Buyers are demanding more information and manufacturers are preparing more diagrams. The smaller diagrams may be projected on the blackboard or upon a large sheet of paper with the opaque projector and then traced lightly with chalk or pencil. The one on the blackboard may be developed later by the trainee, who might go over the light lines with a thicker chalk line. The diagram on the sheet of paper or show card may be filled in with ink or crayon.

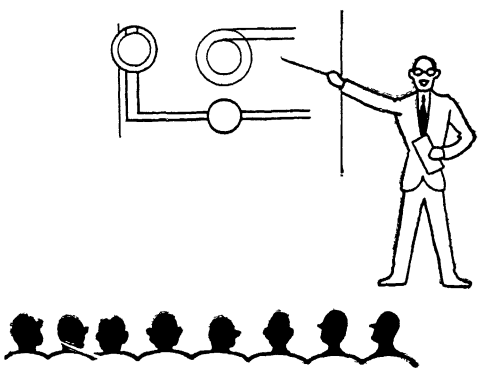


The following suggestions should be observed when preparing your own diagrams:

1. Prepare diagrams accurately to scale.
2. Make lines clean and eliminate all nonessentials.
3. Leave ample space between lines.
4. Use ruler, pencil, curves, and compass.
5. Make all titles and captions clearly visible.
6. Diagram should be large enough for every trainee to see.

7. Diagram should be simple enough for every trainee to understand.

Presenting maps, charts, graphs, and diagrams in training situations. These visual aids are potent spark-plugs because they may be ignited at the crucial moment. Nearly all training sessions offer special opportunities for their use. The appropriate time to present the training aid is when the right opportunity presents itself. The instructor can strike when the iron is hot. *The following general procedure assures success:*



1. *Prepare trainee.* Tell the trainee why the aid is being presented, and point out the important points that he should observe.

2. *Present the aid to trainee.* When you believe that the trainee is ready, present the aid. In a clear-cut manner, explain the illustration and point out each important step in the proper sequence.

3. *Apply information.* Apply the teachings of the aid immediately in the development of a skill or to present information, as the case may be.

4. *Test trainee.* After the aid has been presented, the trainee should be tested, either orally or in writing, to see if he understands the information presented.

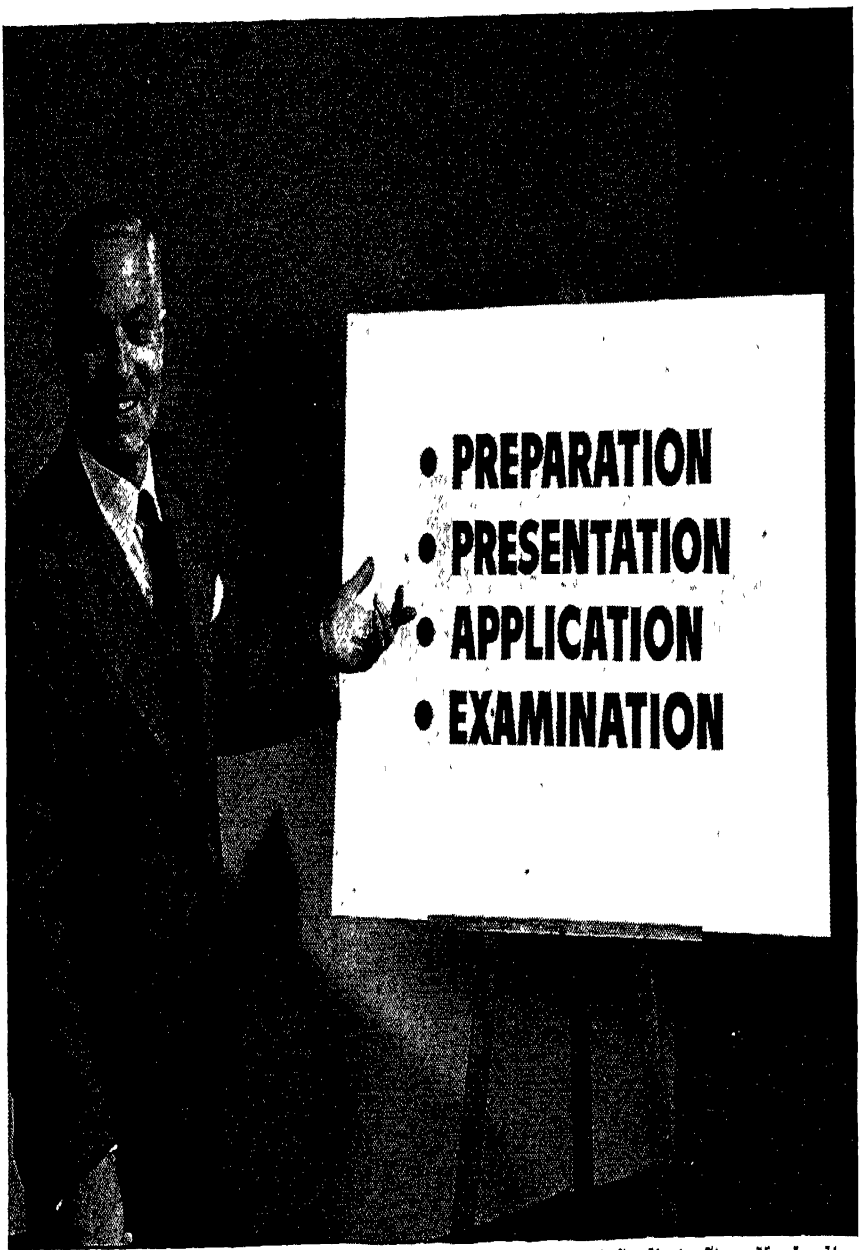
5. *Review aid.* If the testing reveals misunderstanding, reshow the illustration. Repeat each step. If time permits, close the subject with a rapid review of the visual aid. Your training is successful if it is understood by the trainee. Remember, *if the trainee cannot perform—the instructor has not taught.*

DO's for Using Maps, Charts, Graphs, and Diagrams

DO "spark-plug" your instruction with maps, charts, graphs, and diagrams.

DO use these aids in connection with other visual aids and the actual objects.

DO use the opaque projector for presenting small maps, charts, graphs, and diagrams to the training group.
DO utilize flow charts, table charts, and organization charts in training.
DO present statistics in the form on a bar graph, "pie" graph, line-graph, or pictorial graph.
DO permit the trainee to participate in discussing and developing diagrams.
DO apply information immediately.
DO test trainee for understanding.
DO reshow maps, charts, graphs, and diagrams to clear up misunderstandings.
DO follow up instruction by displaying the aid on the bulletin board.
DO make your own maps, charts, graphs, and diagrams large enough for observation by the whole group.
DO make titles and captions clearly visible.
DO exhibit maps, charts, graphs, and diagrams high enough for every store trainee to see.
DO prepare the trainee before presenting aid.
DO present the aid at the crucial moment.
DO explain all symbols and devices to the trainee.
DO stand beside the training aid and not in front of it.
DO speak to the training group instead of the training aid.
DO remove all unrelated material.
DO use a pointer to focus attention.



Courtesy of Syndicate Store Merchandiser

A Pertinent Flash Card.



Flash Cards

IT IS SAID that lightning never strikes twice in the same place, but personnel trainers can strike repeatedly at the understanding of trainees by the use of flash cards.

Flash cards are small compact cards, approximately 10 by 12 inches, which are "flashed" before a training group to bring home an idea. The message the cards contain is brief and to the point. The cards may also be used effectively in a drill or review.

How to Use Flash Cards

In general, the same steps of presentation that apply to other, similar visual aids are applicable to flash cards. These steps are: (1) prepare trainee, (2) present flash card, (3) apply information, (4) test trainee, (5) review.



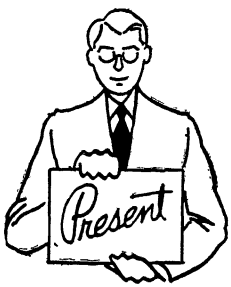


Because of the compact size, pertinent contents, and style of presentation of flash cards, they may be used effectively in a large number of situations. The technique to be employed will depend upon the specific problem or subject that is being presented. Flash cards may also be used to advantage with other training aids, such as large posters, charts, maps, graphs, and diagrams. *Be sure to expose each card so that each trainee can observe it.*

How to Prepare Flash Cards for Training

Simple flash cards. A simple flash card may be prepared by writing or printing the contents on a plain sheet of paper or card. Ordinary wrapping paper, light-colored construction paper, discarded signs, or sections of a cardboard box make good flash cards. An ideal card may be prepared by cutting a large sheet of show cardboard (28 by 44 inches) into eight pieces, 11 by 14 inches each. A large sheet of show cardboard costs approximately twenty-five cents.

Lettering may be applied to the flash card by (1) written or script form, (2) free-hand printing, (3) commercial printer, (4) stencils, (5) stencil cut-outs, (6) cut-out letters, and (7) rubber stamp sets. Unless a large number of similar flash cards are required, commercial printing may be too expensive. However, the other methods will serve the same purpose, and with a little care, you can prepare excellent flash cards.



Written or script. This is the simplest form of lettering. The information is carefully written on the flash card in longhand. The following suggestions will help make your card more attractive:

1. First make a rough draft on ordinary paper.
2. Rule guide lines.
3. Lay out flash card in pencil, and then trace with ink or crayon.
4. Use a speed ball pen with a thick point.
5. Make your writing approximately 2 inches high.
6. Black and red ink are most effective.
7. Use tracing paper to place more intricate material on flash cards.

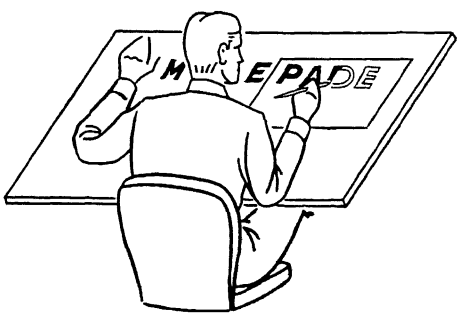


Freehand printing. In a large training room, printed material is usually more effective than that written in script. Free-hand-printed flash cards are much easier to make than would appear at first glance. The secret is to lay out guide lines and to measure and rule off space for each letter before starting to print. Later these guide lines may be removed with an eraser.

Use the following suggestions for attractive flash cards:

1. Center flash card roughly on an ordinary piece of paper.
2. Rule guide lines, and lay out blocks for each letter. Draw lines lightly with pencil.
3. Print content in pencil.
4. Trace with ink or crayon.
5. Use a speed ball pen with a thick point.
6. Use dark colors. Black and red are the most effective.
7. Transpose intricate material to the flash card with tracing paper or by placing the original paper on the flash card and tracing the content with a stylus. Use of a stylus will make a slight impression on the flash card. For best results, the master paper must be thin, otherwise a piece of carbon should be used between the master sheet and the flash card.

Stencils. A particularly attractive flash card may be made by the use of an alphabet stencil, which may be purchased at most stationery counters for ten to fifty cents. A Stenso Lettering Set, consisting of letters, numbers, and figures, 1½, 1, ¾, and ½ inch in height may be purchased for approximately one dollar. Most stencil sets contain a left and right guide hole above each letter to provide for correct spacing.



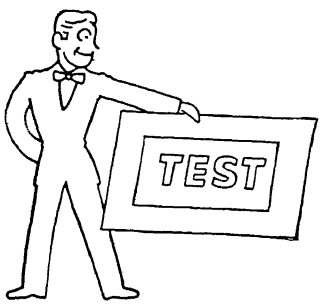
Use these stencils in the following manner:

1. Lay out flash card on an ordinary sheet of paper. This will help you to center the printing on the finished card.
2. Rule guide lines lightly on the flash card with pencil.
3. Place the stencil on the flash card, so that the pencil line shows through the guide holes.
4. Trace each letter with a sharp pencil.
5. Put a small dot in the right guide hole of the letter just traced. The following letter is put in the correct position by placing the left guide hole over this dot.
6. Fill in outline with pencil, crayon, ink, or show-card paint. Use a speed ball pen or brush that will form the different letters of your stencil without unnecessary remodeling.

7. Use bold colors. Opaque colors are best for use with pen and brush.

8. Erase all guide lines and dots with soap or artgum eraser.

Stencil cut-outs. A stencil cut-out should be prepared if several similar flash cards are required. Stencil paper, which has a waxy finish to prevent ink or paint from spreading when it is applied to the stencil, may be purchased at most art-supply or stationery stores. After the stencil is cut, place it on flash card and fill in the letters. You may use pencil, crayon, ink, or show-card paint. A superior job can be done by applying special paint with a small mouth spray.



Use the following suggestions for cutting a stencil:

1. Prepare lettering on a piece of paper the same size as the flash card.

2. Use a square-type Roman letter.

3. Place stencil paper over lettering and trace it with a sharp pencil.

4. Carefully cut out letters with a single-edged razor blade.

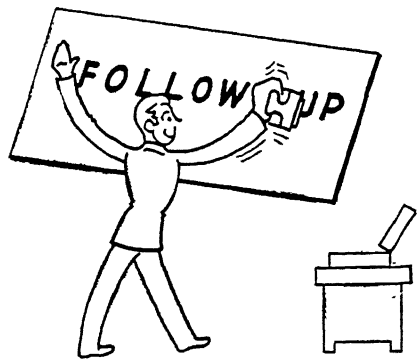
5. After using stencil, wipe off excess ink or paint and store it between sheets of absorbent paper.

"Cut-out letters." Use of cut-out letters is convenient. Suitable letters may be cut from newspapers, magazines, and other printed literature, and may be used individually or as complete words. Specially prepared letters may also be purchased at most art and stationery counters. First arrange all the letters on the flash card in the desired order before attaching them with paste or glue.

Rubber stamp sets. An attractive flash card can be prepared in a jiffy by the use of a stamping pad and a rubber stamp set. A complete set consisting of 1¾-inch capitals and numbers, 1¼-inch small letters, symbols, ruler, spacer, stamping pad and ink, may be purchased for approximately five dollars at most art-supply and stationery stores. The width of the rubber stamp varies, but with a little practice, the letters may be applied directly to the

flash card with the use of the ruler and spacer. However, detailed flash cards should be arranged in advance.

Follow these suggestions for a more attractive job:



1. Lay out lettering on a piece of paper the same size as the flash card.
2. Draw a light guide line with pencil, or use the ruler and spacer for an even line.
3. Ink the pad sufficiently with rubber-stamp ink before using.
4. Press stamp firmly into pad before applying it to the card.
5. Determine the exact position of letter before pressing it down on the card.

Complicated lettering is not necessary: simple letters are the most effective. However, an instructor possessing originality will find many ways of utilizing color combinations, arrows, dots, lines, and other figures to increase the attractiveness and effectiveness of his flash cards.

Examples of Flash Cards

English usage. Poor English is a detriment in store selling. Many common errors in the use of English may be avoided by planned training. The use of the flash-card technique is effective with these job problems and avoids embarrassing a store trainee. Cards upon which are written the most frequent errors made in the use of English may be prepared. Sets should be developed for job problems in (1) adjectives and adverbs, (2) "was" and "were," (3) "says" and "said," (4) "don't" and "doesn't," and (5) double negatives.

1. *Adjectives and Adverbs.*

Adjectives are used to describe or modify nouns or pronouns. Adverbs modify or change verbs, adjectives, or other adverbs. Prepare flash cards similar to the following and ask the trainee to select the correct word appearing in parentheses:

THE CUSTOMER WALKED
(SLOW, SLOWLY) UP THE STEPS.

2. *"Was" and "Were."*

"Was" is used with the pronouns "I," "he," "she," and "it," and with singular nouns. "Were" is used with the pronouns "you," "we," and "they," and with plural nouns. Prepare flash cards similar to the following and ask the trainee to use the correct word:

YOU OUT YESTERDAY?

3. *"Says" and "Said."*

"Says" is frequently confused with "said." "Says," is used in the present tense, "said" in the past tense. Prepare flash cards similar to the following and ask the trainee to supply the correct word:

SHE ALWAYS "GOOD
MORNING" THE MINUTE SHE
ENTERS THE DEPARTMENT.

4. *"Don't" and "Doesn't."*

Use "don't," with pronouns "I," "we," "you," and "they," but never with the pronouns "he," "she," or "it." "Don't" is the contraction of "do not," and "doesn't," the contraction of "does not." When in doubt, test yourself. "Don't" may be used wherever "do not" is correct. Prepare flash cards similar to the following and ask the trainee to supply the correct word:

JANE LOOKS WELL IN THAT HAT.
_____ SHE?

5. *Double Negatives.*

Two negatives in the same sentence usually make the meaning positive. "Bill didn't have no money" means, "Bill *did* have some money." The sentence should read, "Bill did not have any money" or "Bill had no money." Prepare flash cards similar to the following and ask the trainee to give correct sentences for each:

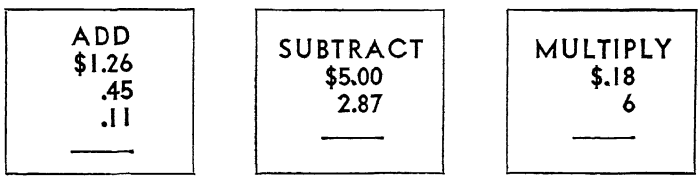
YOU AREN'T NOWHERE
NEAR THE ELEVATOR.

Basic arithmetic. The use of flash cards lends itself readily to the teaching of basic arithmetic. Students of all ages learn much

more quickly when flash cards are employed to give training in (1) fundamentals, (2) common fractions, (3) decimals, (4) percentage, (5) linear, weight, dry, liquid, and other forms of measurement.

Flash cards add zest and interest to arithmetic drills. A sufficient number of flash cards can be developed for each topic to give the student ample practice. Each arithmetic problem can be made pertinent and simple. When necessary, the trainee may use pencil and paper to solve problems. Placing the correct answer on the reverse side of the flash card will facilitate checking by the instructor. Use easy problems at first, gradually working up to the harder ones.

Increasing the tempo of presenting the flash cards to the trainee will also improve trainee ability. The following flash cards are examples from each set of topics:



Industrial organization. Topics that deal with the organization of an industrial plant may be successfully handled with a large organization chart and flash cards. The ideal chart would be constructed out of the individual flash cards, fastened into lines and blocks from which the cards could be removed at will. However, if the chart is not constructed along these lines, a flash card may be prepared that corresponds to each division and classification on the organization chart.

The problem should be developed through the use of the chart. If the chart is of the skeleton type, follow through by removing the flash cards and asking the trainee to replace them in the proper positions. Cover or turn around a blank chart, and then distribute the corresponding flash cards and ask the trainee to place them on the bulletin board in the proper arrangement.

An interesting project may be developed in the training room by distributing the flash cards to the trainees and then asking them to exhibit their flash card to the group and tell what their duties would be. Then permit the trainee to place the flash card in its proper position on the chart on the bulletin board.

Types of customers. The ability to determine types of customers enables the salesperson to serve more satisfactorily. All customers are humanly different, and their moods are subject to continual change. While snap judgments should be avoided, the classification of customers into "types" is very helpful. Flash cards can be prepared for each type of customer. Ask the trainees to tell what they will need to handle that type of customer. Place the correct answer on the reverse side of the flash card to facilitate procedure.

The National Cash Register Company lists the following types of customers and suggestions for handling them:

FOR CUSTOMERS WHO ARE TIRED AND CROSS YOU WILL NEED _____	PATIENCE
(front)	(reverse)
FOR CUSTOMERS WHO ARE FUSSY AND NERVOUS YOU WILL NEED _____	CONSIDERATION
(front)	(reverse)

Job instructor training—JIT. Flash cards have been used effectively in presenting job instructor training. At least six flash cards, one for each meeting, should be prepared. The outstanding objective of each meeting should be carried over from the blackboard to a flash card, which should not be presented to the group until the information has been developed on the blackboard. After the material has been erased from the blackboard, it may be referred to by exposing a similar flash card to the group. Review the topic by pointing to each step on the flash card and have the group read it aloud.

If the meetings are being held weekly, it is very helpful to refresh the mind of the trainee by presenting the flash cards for each previous meeting before starting the new session.

At the last meeting, arrange the training room so that the six flash cards can be displayed in a prominent place. Arrange them in the same order in which they were presented. Before the final meeting ends, point to each flash card and read it to the group. Start with the last one and close the meeting by reading the first card.

First Meeting:

IF THE INSTRUCTOR
HAS TAUGHT
THE WORKER
CAN PERFORM

Second Meeting:

FOUR BASIC STEPS:
PREPARE
PRESENT
APPLY
TEST

Third Meeting:

RELATIONSHIPS

SELLING	TRAINING
1. APPROACH CUSTOMER	1. PREPARE TRAINEE
2. PRESENT MERCHANDISE	2. PRESENT INFORMATION
3. CREATE DESIRE	3. APPLY NEW SKILL
4. CLOSE SALE	4. TEST TRAINEE UNDERSTANDING

Fourth Meeting:

LAWS OF LEARNING:
READINESS
INTEREST
EFFECT
PREPARATION
REPETITION

Fifth Meeting:

FOLLOW UP AND SUPERVISE
OBSERVE
RATE
RETRAIN
COMMEND

Sixth Meeting:

FOUR SKILLS
HOW TO GET READY
HOW TO ANALYZE A TASK
HOW TO INSTRUCT
HOW TO FOLLOW UP

Human Relations Training. For many supervisors, the most difficult part of their job is acquiring the ability to work effectively with people. This ability is vital to good supervision because every act and decision of the supervisor has a bearing in one way or another on the attitude, morale, and efficiency of employees. Human relations training is a practical way of helping supervisors develop skill in getting satisfactory results through the people they supervise.

Although the instructor of a group studying human relations will adhere to a carefully prepared outline, flash cards based on the necessary blackboard work are very helpful. To implement this kind of training, the following flash cards were developed by Harold W. Thomas, Supervisor of Distributive Education, Commonwealth of Pennsylvania.

A SUPERVISOR'S FIVE NEEDS

Knowledge of the work
Knowledge of responsibilities
Skill in instructing
Skill in improving methods
Skill in leading

THIS IS YOUR JOB!

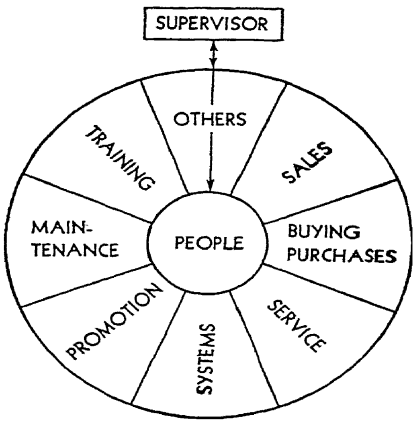
1. To MANAGE
 When you plan the use of workers' merchandise and equipment
2. To SUPERVISE
 When you have workers carry out your plans
3. To INSTRUCT
 When you teach workers to execute your plans

ASK YOURSELF
THESE QUESTIONS

THE EMPLOYEE

1. Is he "doing a good job"?
2. Does he fail to understand instructions?
3. Does his attention wander from the job?
4. Is he interested in his job?
5. How does he respond to recognition?
6. Is he self-reliant?
7. Does he seem poorly adapted to the job?
8. Does he get along well with the other people in the department?

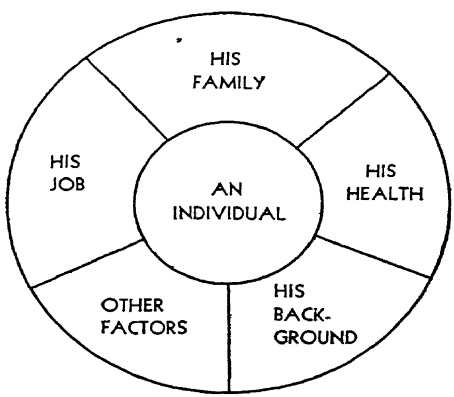
A SUPERVISOR GETS RESULTS
THROUGH PEOPLE



FOUNDATIONS FOR GOOD RELATIONS

1. Greet workers in a friendly manner
2. Let each worker know how he is getting along
3. Give credit when due
4. Tell people in advance about changes that will affect them
5. Make best use of each person's ability

PEOPLE MUST BE TREATED AS INDIVIDUALS



HOW PROBLEMS ARISE

1. You run into them
2. They are brought to you
3. You sense an attitude change in your department
4. You anticipate them due to policy changes

HOW TO HANDLE A PROBLEM

1. Get the facts
2. Weigh and decide
3. Take action
4. Check results

WHAT THE FOUR-STEP METHOD WILL DO FOR ME

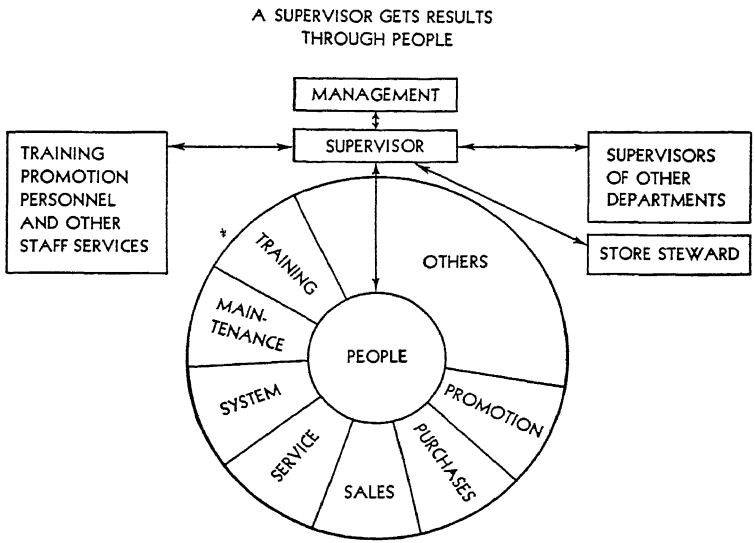
1. More confidence in ability to handle people
2. Better standing with my employees
3. Better standing with my management
4. Fewer job headaches
5. Less criticism
6. Organized plan to follow
7. Save me time

HOW TO GET OPINIONS AND FEELINGS

Don't argue
Encourage him to talk about what is important to him
Don't interrupt
Don't jump at conclusions
Don't do all the talking yourself
LISTEN

THE EFFECTS OF GOOD SUPERVISION

1. Improve YOU on the job
2. Give returns to YOU, your DEPARTMENT, and your COMPANY



DO's for the Use of Flash Cards

DO prepare flash cards for all pertinent training jobs.
DO make flash-card copy as brief as possible.
DO use lettering large enough to be easily read.
DO prepare the trainee before flashing the card.
DO flash the card at the right moment.
DO exhibit it high enough for clear vision.
DO expose it long enough for trainee comprehension.
DO vitalize a drill problem with simple flash-card sets.
DO develop test sets of flash cards for specific training units.
DO review a job problem by exhibiting all key flash cards.
DO follow-up instruction by placing pertinent flash cards on the bulletin board.
DO correlate flash cards with other training aids.
DO create original flash cards.
DO experiment with color combinations in addition to black on white.
DO catalogue and file all flash cards for easy reference.



Courtesy of Wm. Filene's Sons Co.

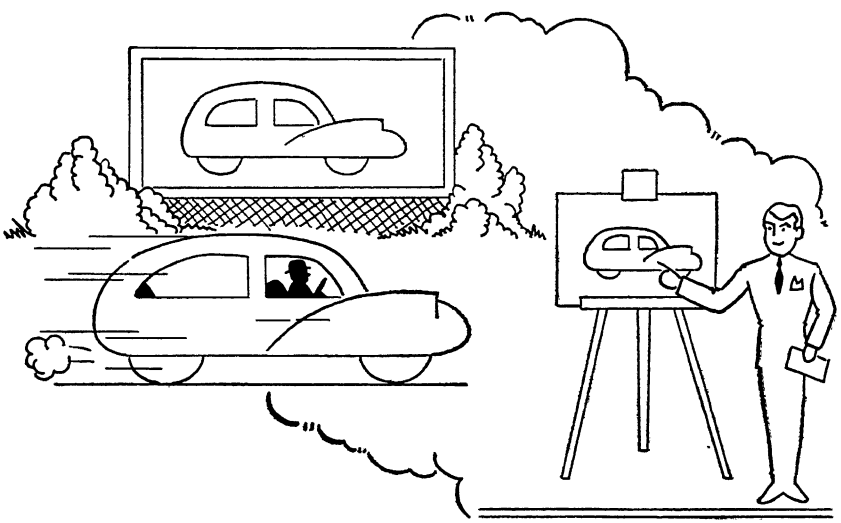
USING "BLOW-UPS" FOR CLARIFICATION.



Posters and Manuals

THE COUNTLESS NUMBER of billboards spread across the country have only one purpose—to put across an idea in one fleeting glance. Posters accomplish the same purpose.

Large posters, such as billboards, could not be used conveniently in a training room, but smaller ones tell their story as vividly. An ideal poster size is 28 by 22 or 44 by 28 inches, depending on the size of the training room. A poster may utilize charts, graphs, diagrams, maps, pictures, cartoons—in short, anything that will help present the facts or emphasize a subject.



How to Use Posters

Check through your training plan and select the topics and subjects which could be presented more effectively by the use of a pertinent poster. Select or prepare the posters illustrating these job problems. Remember that a good poster has one dominant idea, namely, to tell its story at a glance.

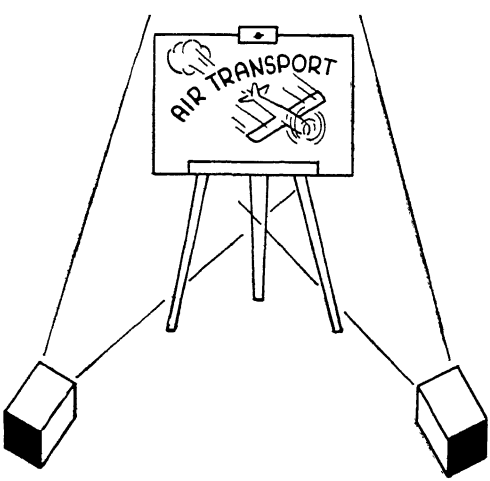
The poster may be used to (1) introduce, (2) present, and (3) review the topic or subject.

Regardless of when the poster is used, the following steps are essential: (1) prepare the trainee, (2) present the poster, (3) apply the information, (4) test the trainee, (5) review the subject or problem.

The time or methods required to carry out each step varies and will depend chiefly on the topic and the nature of the group of trainees.

Introducing the topic. The poster is an effective way of introducing a new topic. The following steps should be followed:

1. Arrange the training room before the group meets.



2. Display the poster on an easel, in a conspicuous place in front of the room.
3. If possible, throw a spotlight on the poster. The light from a slide or opaque projector will serve the purpose.
4. As the trainee enters the room his attention will be drawn to the poster.
5. After a brief introduction, explain the purpose of the poster.
6. Turn off the spotlight after using the poster.

This method is effective because the group is introduced to the topic or problem before the actual training begins.

Presenting the topic or subject. The majority of training posters are used to present the steps in a topic. Each step or idea in the poster is carefully presented to the trainee in proper order.

Tell and show each step. If possible, correlate the poster with other visual aids. Use the blackboard, photographs, slides, models, actual objects, or any other training aid that will clarify the job problem.

Reviewing the topic or subject. Before closing the meeting, the subject or lesson should be reviewed by throwing the spotlight on the poster and briefly reading each step or idea to the trainees.

Another review method, especially adaptable to short unit programs, is to lay out a space on a bulletin board or a wall for posters based on each meeting. As each job problem is completed, the poster is put in its proper place. At the completion of the program, the complete set of posters is reviewed.

Trainee-made posters. Excellent projects may be developed by encouraging students to prepare posters on specific training problems in which they are interested. Allow them sufficient time to collect the material, and then permit them to present their posters to the group. For some novel and creative ideas, ask the trainee to prepare the title without writing or printing it with pencil, pen, paint, or crayon. For example, the title of a textile poster may be prepared by gluing or sewing the actual textile material to the poster to spell out the title.

Examples of Posters

An excellent example of the use of posters for training adults is the material used in the "Laundry Routeman" course, developed by the New Jersey State Department of Education. These posters are made up to resemble typical articles of apparel on a clothes



line. A striking appearance is given to the training room by a long clothes line pulled across the front of the room and by posters cut out in the shape of clothing hung up with real clothes pins. Each poster is a facsimile of clothes cut out of sail cloth, and is

approximately 20 by 24 inches, and in duplicate, so that the top piece may be turned back to show the under piece. The top pieces are hand-lettered in red and blue on white sailcloth, and the bottom pieces are hand-lettered in orange and green on white sailcloth. The posters contain the following suggestions for laundry routemen:

1. *Poster shaped like a child's dress.*

TOP PIECE. No-o-o, madam, much as I would like to say "yes." We just *can't* accept new business now. Why not give me your name and address, and you'll be the *first* one I notify when we are able to add to our customers.

2. *Poster shaped like an apron.*

TOP PIECE. I wouldn't know when you'll get it back—or *how!*

BOTTOM PIECE. We really *are* short-handed these days, but you can be *sure* our folks are working hard to give *our* customers as *much* service as we can . . . and although I can't make a *definite* promise, we'll do our *best* to return it promptly.

3. *Poster shaped like a man's shirt.*

TOP PIECE. *Shirts* late? . . . You oughta be glad you *have* a shirt!

BOTTOM PIECE. I'm sorry, Mrs. Jones, but it seems that there's been *more* absenteeism than ever at the plant. So much sickness around right now. I'll have *your* husband's shirts back *just as soon* as possible.

4. *Poster shaped like a pillow case.*

TOP PIECE. I don't *own* the laundry—I only work there!

BOTTOM PIECE. We've had to eliminate the "frills" these days, but as soon as the new equipment arrives, we will be able to provide more service.

5. *Poster shaped like a man's undershirt.*

TOP PIECE. Well, *go ahead*—try and get another laundry!

BOTTOM PIECE. I guess you're tired of hearing excuses, Mrs. Brown, but frankly, we *are* working under handicaps. However, conditions are improving rapidly and we hope to be up to our usual standards very soon.

6. *Poster shaped like man's long union suit.*

TOP PIECE. Gee, ma'am, people *ought* to do their wash *at home,* at least most of it!

BOTTOM PIECE. *Some* of my customers are doing their hankies, socks, doilies and other small items at home. This *helps* speed up the larger and hard-to-do articles at the plant.

Other aids. This excellent training program also utilizes other visual aids, such as models, flash cards, photographs, cartoons, multiple poster book, a facsimile rule, and a wooden pie. A brief description of each of these aids follows.

1. *A facsimile rule*—72 inches long, divided into four articulating sections, each rule folding into length of one section. Painted yellow with black space marks and the words COURTESY—COMPETENCE—COOPERATION—COORDINATION on each section respectively.

2. *Multiple posters* joined with a wooden stick at top—consisting of six posters 36 by 24 inches. It may easily be hung on an easel.

First poster. Two cartoons depicting general customer attitude to be taken by salespersons.

Second poster. Outline of routeman-customer relations course.

Third poster. Blown-up photographs showing "bad" and "good" examples of customer and routeman contacts.

Fourth poster. Routeman training.

Fifth poster. Blown-up photographs of routeman's "good" and "bad" contacts with customer.

Sixth poster. BUILDING A BULWARK AGAINST POST-WAR COMPETITION.

3. *Cartoons.* A series of ten cartoons on flash cards, 15 by 22 inches, showing routemen with the following heads:

Mouse Head	Oyster Head
Wolf Head	Cat Head
Parrot Head	Mule Head
Dog Head	Pig Head
Monkey Head	*and* Ideal Routeman

4. *Illustrations.* Twelve illustrations of Techniques for Handling Customers. These posters are prepared in black and white and color on 15 by 20-inch cards. They are arranged alphabetically for "easy reading."

ASK QUESTIONS to win co-operation!
BE BRIEF to clear up troubles!
CONFIDENT BEARING . . . to control others!
DIRECTNESS to reach into people's minds!
EARNESTNESS to arouse enthusiasm!
FRIENDLINESS to overcome opposition!
HARNESS CRITICISM in a way to win appreciation!
INCREASE OTHERS' SELF-ESTEEM to cultivate loyalty!
JINGLE PRAISE to secure best efforts!
KNOW YOUR CUSTOMERS to generate harmony!
GOOD MANNERS TO CEMENT CUSTOMER-RELATIONS!

5. *Flash cards.* Six cartoons on flash cards 14 by 14 inches, showing moods and reactions of different women customer types.

6. *Mounted board.* A large mounted board of cartoon series size 22 by 28 inches depicting notes left for a routeman entitled Notes to a Routeman.

7. *Model.* Model of house 24 inches high on platform 26 by 17 inches with: miniature truck 13 inches long and 7 inches high; routeman figure 7 inches high; three customer figures each 7 inches high; and bundle of laundry and dry cleaning—all in full colors.

8. *Pie for creating good will.* A wooden pie, measuring 28 inches in diameter, cut into ten sections. CREATING GOOD WILL is printed on the top, and when each section of pie is lifted, it reveals the technique for creating good will.

Sources of Posters

A large number of good training posters may be secured from manufacturers, processors, libraries, museums, Chambers of Commerce, exhibitions, fairs, trade organizations, and government agencies. Most of these posters are distributed free of charge: a penny post card requesting the material is all that is necessary. Many of these sources will place you on their mailing list to receive new materials developed in the future.

Home-made posters. The best training posters are home made. Your own posters should have sufficient visual appeal to attract and hold the attention of the trainee long enough to put the facts across. Home-made posters should be:

1. Directly related to the specific topic. This is the chief reason for making your own posters.

2. Clear and forceful. There should be no doubt about the message the poster conveys.

3. Illustrated with pictures that tell the story. Titles and brief captions will help clarify meaning.

4. Well designed. The layout of the poster has a great deal to do with its effectiveness. It should center on one dominant job task. A forceful poster is plain, simple, and direct.

5. Colorful. Color attracts attention. When smartly used, it is one of the best methods of focusing attention on an important point. Use bold, vivid colors to obtain striking effects.

Size and material. The size of the poster will depend upon the size of the training room. Large posters 44 by 28 inches and small ones 28 by 22 inches will be adequate for most situations.

Ordinary wrapping paper, the backs of old posters, construction paper, and fiber boards will provide suitable background material. However, a sign card or show cardboard will prove to be most satisfactory. A thick sheet of cardboard, 44 by 28 inches, may be purchased for approximately twenty-five cents.

Titles and captions. Make titles attract attention and keep all captions brief. The title should be clearly visible to the entire group. If printing is used, the letters should be clear and approximately 2 inches high. Lengthy captions should be avoided. A good title is brief, but tells the story.

Contents. The originality of the instructor will determine the contents of posters. Pictures, photographs, charts, graphs, maps, diagrams, lines, arrows, circles, and actual objects may be used. When models, specimens, or other objects are used, they may be attached to the poster with staples, scotch tape, needle and thread, or paste.

Comic books. Comic and cartoon books are rapidly becoming potent training devices, and should be utilized in your poster. A humorous story will arouse the interest of a trainee, and a good cartoon that emphasizes an important idea will have the same effect. Long after the subject is forgotten, the cartoon will be remembered. Cartoons are especially helpful in giving directions, calling attention to errors, and building morale. They appeal to the sense of humor, one of the most valuable assets of a trainee. Remember, you can catch more flies with honey than you can with vinegar.

Manuals

Briefly, a manual should contain all the possible information pertaining to a specific object, device, or type of merchandise. A working knowledge of the manual should enable an employee to (1) talk intelligently about his job or commodity, (2) answer customer questions concerning merchandise, (3) give suggestions on how to use and care for equipment or devices, (4) display and sell products more effectively, and (5) give all-around better employee service. A trainee who has developed, or has complete understanding of, a good manual really becomes an expert in that specific field.



Sources of Manuals

Manufacturers and processors who realize that it is to their advantage to have intelligent representatives make, service, and sell their merchandise, are preparing excellent manuals to accompany their products The following is a partial list of other sources of manuals.

1. *Government Agencies:*
 United States Department of Agriculture.
 United States Department of Commerce.
 United States Department of Labor.
 United States Office of Education.
 Bureau of Mines.
2. *Universities:*
 Research Bureau for Retail Training, University of Pittsburgh, Pittsburgh, Penn.
 Extension Division, University of California, Berkeley, Calif.
 Extension Service, Iowa State College, Ames, Iowa.
 Bureau of Business Research, University of Illinois, Champaign, Ill.
 Bureau of Business Research, College of the City of New York, N. Y.
 Bureau of Business Research, Harvard University, Cambridge, Mass.
 Bureau of Business Research, Ohio State College, Columbus, Ohio.
3. *Publishing Concerns:*
 Butterick Publishing Company, New York, N. Y.
 Chilton Company, Inc., Philadelphia, Penn.
 Fairchild Publications, New York, N. Y.
 Gill Publications, Boston, Mass.
 Haire Publications, New York, N. Y.
 Superior Printing and Lithographing Company, Akron, Ohio.

4. *Trade Associations:*
 National Retail Dry Goods Association, New York, N. Y.
 National Livestock and Meat Board, Chicago, Ill.
 National Dairy Council, Chicago, Ill.
 Retail Shoe Salesmen's Institute, Boston, Mass.
 Association of Fur Industry, New York, N. Y.
 National Retail Hardware Association, Indianapolis, Ind.
 American Toy Manufacturers' Association, New York, N. Y.
5. *Trade Journals:*
 American Jeweler, Chicago, Ill.
 Chain Store Age, New York, N. Y.
 Dry Goods Economists, Philadelphia, Penn.
 Men's Wear, New York, N. Y.
 Milinery Trade Review, New York, N. Y.
 Progressive Grocer, New York, N. Y.
 Retail Home Furnishings, New York, N. Y.
 Women's Wear Daily, New York, N. Y.

Home-made manuals. A "slick paper" professionally prepared manual is attractive and helpful, but it cannot be compared with the value of a trainee-made manual. The trainee prepares his manual on the phase of work in which he is especially interested at the time. The effort exerted in collecting information, organizing the material, illustrating, arranging and laying out the manual, preparing the cover, and the many other activities connected with the preparation of the manual, will give more meaning and value to the finished job.

How to make a trainee manual. Although the originality of the trainee should not be inhibited, certain basic information should be included in the manual. The following chapter headings will guide the preparation of a merchandise manual:

Chapter I:	Romance of Merchandise
Chapter II:	Raw Materials Used
Chapter III:	Manufacturing Processes
Chapter IV:	Types of Merchandise
Chapter V:	Colors of Merchandise
Chapter VI:	Sizes of Merchandise
Chapter VII:	Uses of Merchandise
Chapter VIII:	Stock Arrangement
Chapter IX:	Display and Advertising
Chapter X:	Care of Merchandise
Chapter XI:	Selling Points
Chapter XII:	Government Regulations

In addition to these twelve basic chapters, the manual should include: (1) an original cover, (2) a title page, (3) a preface, (4) a table of contents, (5) a brief objective test based on each chapter, and (6) a complete bibliography for future reference.

The following suggestions should also be followed:

1. The material should be arranged neatly and attractively.
2. A clear, hand-written copy is as effective as a typewritten copy.
3. Ink should be used instead of pencil.
4. Use one side of a sheet of paper and number each page.
5. Be liberal with the use of pictures and other drawings to illustrate specific points.
6. Sometimes it is advisable to include complete leaflets or booklets that are especially descriptive.
7. Specimens and other bulky objects should be attached securely with cellophane and scotch tape.
8. Develop a staple binding.
9. Include all correspondence with outside agencies.
10. Strive for originality in cover and manual layout. For example, a trainee manual in deodorants was made in the shape of a deodorant bottle. A manual on furs boasted a cover which consisted of a woman dressed in a real fur outfit made from scraps of fur picked up at a furrier's. With a little encouragement, a trainee will think of many similar twists for his own merchandise manual.

How to Use a Manual

Regardless of how attractive a manual appears, it is worthless unless it is studied and utilized. The exact training procedure depends upon many variable factors, such as the type of commodity, the ability of the trainee, and the actual training situation. In-service training would of necessity limit the time spent on the merchandise manual. However, whether the training is being given on the job or in the training room, it should be presented in the following orderly procedure:



1. *Prepare trainee.* Thinking isn't rationed on the job, but before the trainee will exert effort, he must see how the information in the manual will help him. A brief review of the manual will show the trainee many of the important principles of good department management, effective department layout, planned stock control, proportioned production, promotional ideas, best sellers, and other pertinent information. To the trainee, this will mean better depart-

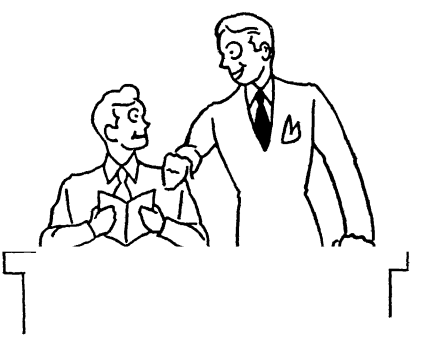
ment operation, greater and better production, increased earnings, and eventual promotion—all of which usually adds zest to a trainee's thinking.

2. *Present manual.* Even when time is at a premium, it is still worth while to go through the manual with the trainee page by page. Even the comparatively green trainee will grasp the more important points which you have emphasized. Do not expect the impossible. The trainee cannot swallow an entire manual in one gulp. Ask him to study the manual one section at a time, in easy doses.



3. *Apply manual information.* This is the most important step in the procedure. Each applicable suggestion in the manual should be applied to the trainee's specific situation. For best results, the information should be used immediately.

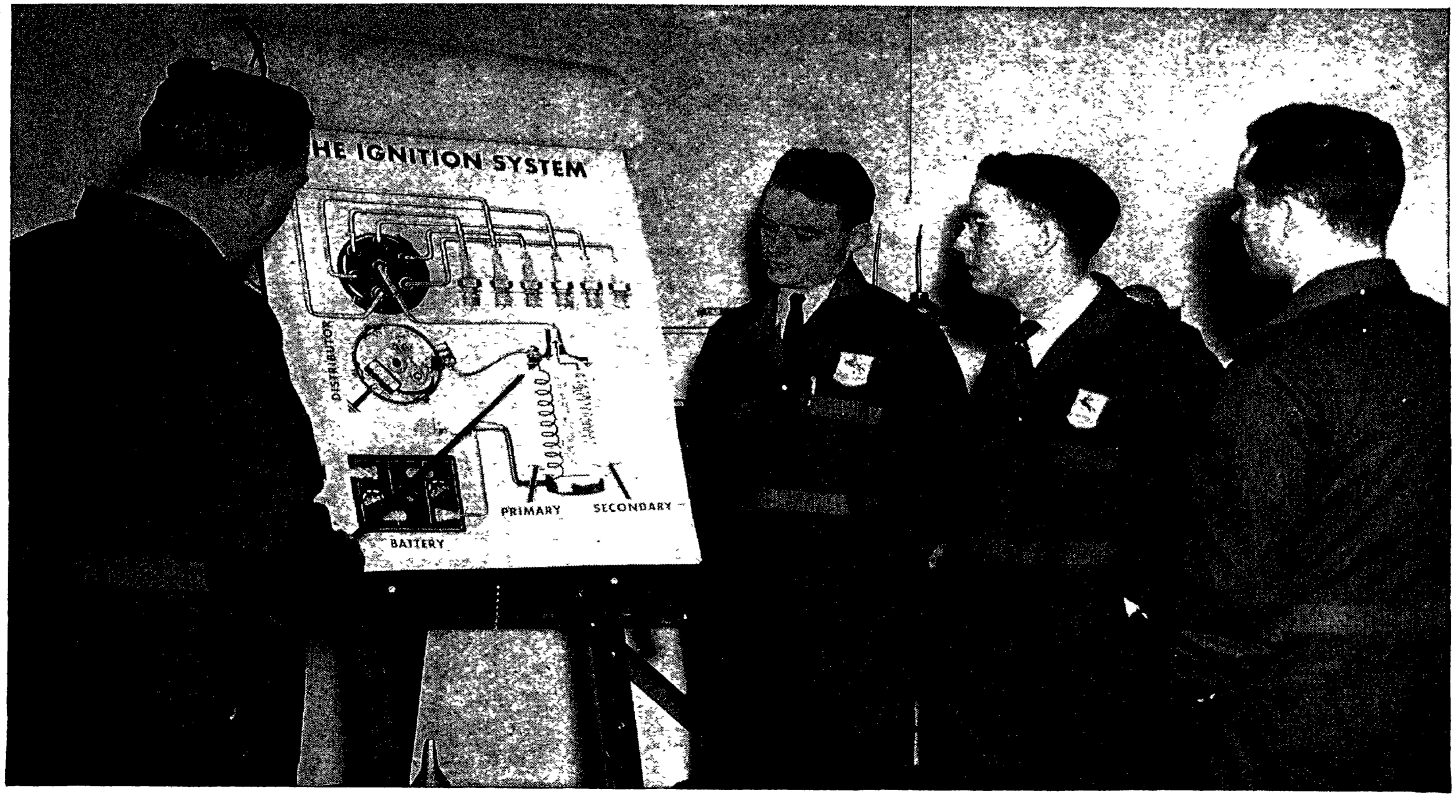
4. *Check trainee.* A good instructor will follow through by checking the trainee's application of instructions and suggestions contained in the manual. Misinterpretations and errors should be corrected immediately. In many cases, a trainee will lose interest if he does not think the supervisor or trainer is interested enough in what he is doing to come back and check his work. On the other hand, the trainee might need more basic help on how to carry out some suggested idea.



5. *Follow-up trainee.* This final step is overlooked by many trainers, but if its value were fully realized, it is doubtful whether follow-up work would be neglected. The follow-up technique varies and depends upon the specific job, but basically it consists of (1) observing, (2) rating, (3) retraining, and (4) commending the trainee. Any remaining errors are corrected and helpful suggestions are made. When a trainee does a good job, by all means commend him for it: praise will give him an emotional lift whose effects will become manifest in all he does.

DO's for the Use of Posters and Manuals

DO illustrate training topics with relevant posters and manuals.
DO make your poster tell its story at a glance.
DO use suitable manufacturers' posters and manuals.
DO encourage the trainee to prepare his own posters and manuals to illustrate training projects.
DO require trainee to make a manual concerning the specific job he is doing.
DO prepare the trainee before presenting the poster or manual.
DO use an easel to display poster.
DO display poster and manual so that they are easily seen.
DO explain each important item thoroughly.
DO use posters and manuals with other related training aids.
DO discuss or apply the poster or manual information as soon as possible.
DO test the trainee's knowledge of the poster or manual.
DO reshow the poster or manual to review the job problem.
DO follow-up the job problem by exhibiting poster on the bulletin board.
DO permit individual trainee inspection of the manual.
DO catalogue and file posters and manuals in a suitable place.



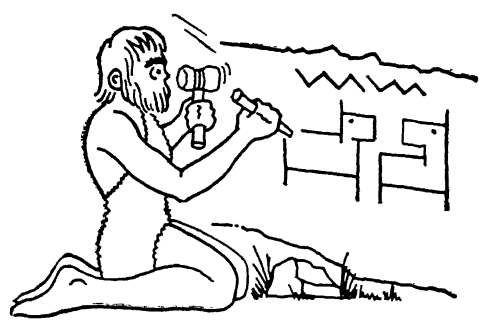
Courtesy of Socony Vacuum Oil Co.

SIMPLIFYING COMPLICATED SYSTEMS WITH DRAWINGS AND DIAGRAMS.



Pictures and Photographs

Power of pictures. Without pictures the world today would not be as meaningful as it now is to most of us. Pictures crystallize ideas and form much of the basis for thinking. Successful, planned training depends upon the effective use of pertinent pictures. In training, pictures may be used to (1) arouse interest, (2) introduce new subjects, (3) illustrate specific steps in the job, (4) build good job attitudes, (5) develop appreciation, (6) test trainee's knowledge, and (7) review units of subject matter.



Each year industry and commerce spend millions of dollars for advertisements in newspapers and magazines because pictures





put their story across. Use of pictures in training will bring similar profitable returns.

The unlimited supply of good training pictures, the ease with

which they may be obtained, and their extreme economy, makes them one of the most valuable training aids.

Sources of Pictures

Pictures are where you find them: in the comic section of the Sunday paper or the cover page of *Esquire.* The countless number of advertisements, leaflets, brochures, and other booklets that you receive through the mail are all potential sources. It would be difficult to go through the popular magazines, such as the *Saturday Evening Post, Ladies' Home Journal, Good Housekeeping, McCall's, Red Book, American Magazine, Fortune,* and *National Geographic* without obtaining some good training pictures.

The fashion magazines, such as *Vogue, Harper's Bazaar,* and *Mademoiselle,* provide excellent illustrations, not only for style and design, but for many other related fields such as textiles, display, store layout, and ensemble selling. In addition, there are magazines for all special fields of manufacture, commerce, and the professions.

How to Mount Pictures

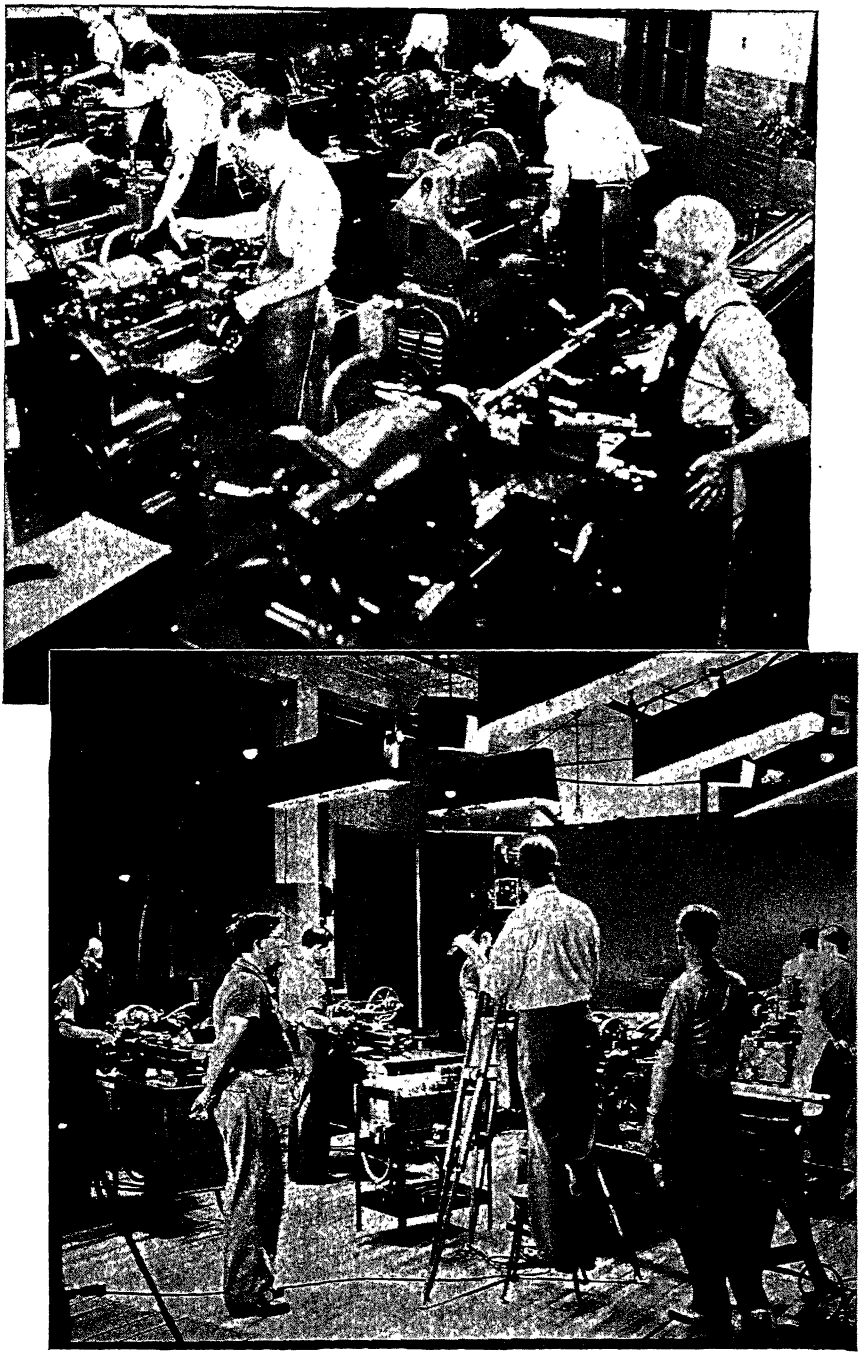
Any picture worth using is worth mounting. Mounting a picture (1) protects it, (2) makes it more attractive, and (3) increases its effectiveness. Mounting is a simple operation, but a slip-shod job detracts from the original value of the picture.

The following items should be carefully considered:

1. **Type of mounting.** In order to conserve space in the file, use a thin but durable cardboard. Illustration board, show cardboard, and construction paper make good mounts.

2. **Color.** A neutral color, such as tan or gray, may be used safely with most pictures. For a striking effect, select a color that blends with the predominant color in the picture.

3. **Size.** The majority of pictures and photographs available to the trainer will be 8 by 10 inches or less. In order to facilitate the filing system, use mounts in the following sizes: (1) 8½ by 11 inches for the large pictures, (2) 8 by 9 inches for the intermediate group, and (3) 3¼ by 5½ inches for the small pictures. This size range can be adequately handled by standard filing equipment. The 8 by 9 and 3¼ by 5½-inch mounts have been suggested for dual purposes: trainee inspection and for efficient use in most opaque projectors. The former may be used on the pro-



Courtesy of South Bend Lathe Works

PREPARING TRAINING FILM ON THE JOB.

jector platon, and the latter in the post-card holder. When the larger mount is used in the projector, only 6 by 6⅜ inches of the picture will be projected.

4. **Adhesive.** Paste, glue, rubber cement, or scotch tape may be used in attaching the picture to the mount. If paste or glue is used, cover the back of the picture and to avoid smearing place it on the mount carefully. Press the mounted picture under some weights to prevent it from curling when the paste or glue dries. Weights need not be used with rubber cement because this cement will not curl the mount as it dries.

5. **Captions.** The perfect picture speaks for itself, but the majority of training pictures are much more effective when accompanied by brief, pertinent captions. If possible, place these descriptions on the front of the mount to avoid constant turning of the picture. A lengthy text, questions, or suggested trainee projects may be placed on the back of the mount.

6. **Labeling pictures for filing.** A good filing system requires adequate labeling of each picture. Depending upon the "breakdown" of your filing system, place the job unit or topic in the upper left- or right-hand corner of the mount. If an identifying number is used, place it in the opposite corner.

7. **Special effects.** Simplicity is the keynote for training pictures. However, occasionally dramatic effects may be obtained by "bleeding" a picture or by placing it flush in one of the corners. The artistic arrangement of several smaller congeneric pictures on one mount will also produce interesting effects. A series of that type should tell a complete story.

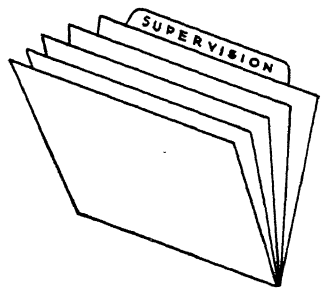
Pictures that are rare and require frequent use should be protected by a cellophane cover. Follow this simple procedure:

1. Cut a piece of cellophane ½ inch larger than the mount on each side.
2. Place mounted picture in the center of the piece of cellophane face down.
3. Fold edges of cellophane neatly.
4. Paste or glue edges on the back of the mount.

Filing Pictures and Photographs

Develop a "finger-tip" technique. A simple filing system will make it possible to locate the right picture at the right time.

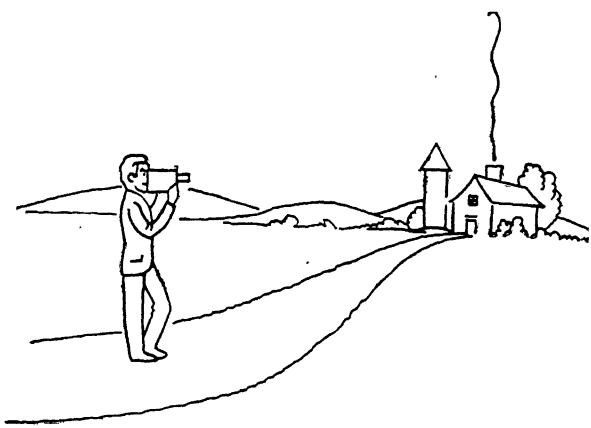
Use the same topics developed for the opaque projector material file. If it is conveniently possible, use the same file for the opaque projector material, and for pictures or photographs. However, when the file is accessible to the trainee, it is desirable to keep the more confidential material, such as test sets for use in the opaque projector, in a separate file.



An active file requires constant care. When a file is used by a large group there is a tendency to (1) place material in wrong folders, (2) spoil material by careless handling, and (3) forget to return material after using. Obviously these errors must be avoided. The importance of proper filing should be stressed to each trainee.

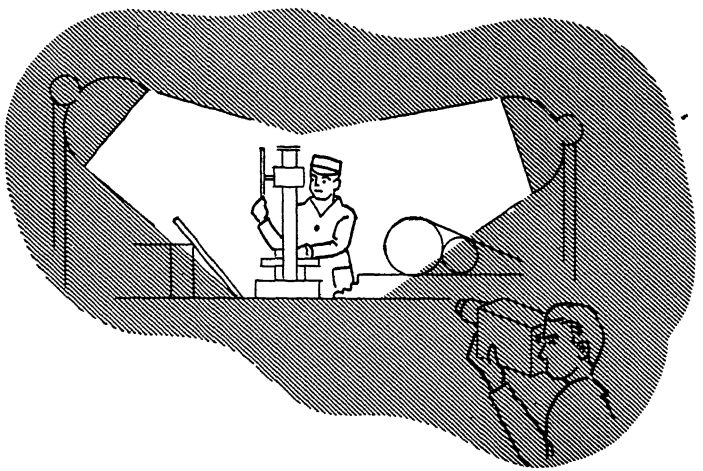
How to Make Your Own Pictures

Variations in exposure conditions, cameras, and film, prevent us from giving specific directions for making training pictures. However, satisfactory results will be obtained by carefully following the manufacturer's directions which accompany your camera and film. Correct exposure is assured when a light meter is used, but it is not absolutely necessary to have such a meter. Excellent pictures have been made with a 98-cent box camera.



Most indoor shots usually require special lighting, fast film, and a camera with a good lens, although it is possible to take an indoor

"still shot" with an inexpensive box camera by using a time exposure and resting the camera on a solid object to prevent it from



moving. It is undesirable to include people or moving objects in a picture of this type.

The following helpful suggestions have been made by Dr. E. Dana Gibson.[1]

1. Select the area in which you feel a series of pictures will do you the most good.

2. Jot down the names of objects or situations that pictures will help you to explain to your class.

3. Discuss these with other business teachers, or check against texts, articles, or style books to see if you have forgotten teaching situations or objects that pictorial material would help illustrate.

4. Select mainly those items that offer the most contribution to the lesson. Limit your list to those pictures you can obtain easily.

5. Write out the explanation you want to place on the back of each picture. This will induce you to make further changes in the situations selected for "shooting" and help clarify your thinking as to their classroom value.

6. Divide your list of "shots" into two parts: one to contain all indoor pictures; and the other, outdoor scenes. This is necessary to avoid frequent changing from indoor to outdoor films.

7. Use 35 mm. indoor and outdoor Kodachrome film if possible—color adds interest to your pictures, and 35 mm. is an ideal size to use and a necessity if a filmstrip is to be made later of the pictures taken.

Now divide your indoor and outdoor lists into two groups—one to contain the distant shots and the other the close-ups. On the first group you will have little difficulty in getting the pictures wanted, but close-ups

[1] *Business Education World,* April, 1945.

may require the help of the local photographer or considerable experimenting on your part with the camera to get sharp negatives. A portrait, copy lens, or extension tubes may have to be purchased for close-ups.

The best way to take close-ups with the average camera is to sort all "shots" into groups having the same physical dimensions. Then obtain a piece of fine ground glass the same width as your 35 mm. film, edge to edge, and about 1½ inches long. Open the back of the camera and place the ground side next to the lens. Focus on this glass, insert the film, and snap the picture. Slide in the next picture in the same group, and repeat the process until all pictures of that size are taken. Repeat this process for each group. This saves a great deal of focusing.

8. Before taking any pictures, study the situation or object to be taken and jot down notes as to the angle you think will be best from which to take it. Also, determine the distance necessary to obtain the picture, the exact setting (where is the object to be placed—if people are involved, what are they to be doing), and the shadow necessary to bring out needed contrast.

9. After the pictures have been developed, retake those not of good composition. Enlarge those that are satisfactory to 8 by 10 inches, a good classroom size.

10. Correlate the pictures selected with definite parts of your lessons. Unless you know exactly where they will fit best into the lesson plan, all previous work will have been more or less wasted.

11. To provide safe storage and easy use, set up a filing system for your pictures. This can be a letter file converted into a picture file. The picture should be placed in a folder like that used for letters.

Light filters. Light filters skillfully handled can be very helpful in preparing training photographs that are technically correct and of artistic merit. Light filters do exactly what their name implies: when attached to the lens holder on the camera, they keep out or absorb the undesirable light rays and permit the desirable ones to enter the camera, which enables you to secure the proper effects in your photograph. These filters are chiefly used (1) for correction purposes, (2) to develop contrast, (3) to overcome atmospheric haze, (4) to control sky brightness, and (5) for making tri-color-separation negatives. Neutral density filters are used to reduce exposure when photographing bright subjects such as a welding operation or an open blast furnace.

"Polarized light." "Polarized light," such as made possible by the Kodak Pola-Screens or the Polaroid filters, not only produce dark sky effects without distorting other values and heightening cloud-to-sky contrast, but can also (1) remove glare from water, (2) eliminate disturbing reflections from glass objects and

FILTER RECOMMENDATIONS FOR COMMERCIAL SUBJECTS
(WITH TYPE B PANCHROMATIC MATERIAL UNLESS OTHERWISE SPECIFIED)

Subject	*Effect Desired*	*Suggested Filters*
ARCHITECTURE: Light-colored buildings against blue sky	Separation between building and sky	K2
	Greater contrast between building and sky	G
	Dark sky	A
	Darker sky with any of above filters	Pola-Screen
Red brick buildings	Lightening of tone to show texture	G
Reflections from roofs and windows	To subdue	Pola-Screen
AUTOMOBILES: Dark colors	Lightening of tone to show shape and detail	Filter similar to color of car
Lettering on trucks, buses, etc.	Contrast to increase legibility	
Reflections from lacquered surfaces	To subdue	Pola-Screen
COLORED CHINA, GLASS, PLASTICS, POTTERY, TILE, MOSAICS:	Natural rendering	K2 or X1
Reflections	To subdue	Pola-Screens at lens and lights
FABRICS, CLOTHING, TAPESTRIES, UPHOLSTERED FURNITURE:	Natural rendering	K2 or X1
Dark colors	Lightening of tone to show texture	Filter similar to color of material
FURNITURE: Red woods, as mahogany and rosewood	Best rendering of wood grain	A
Yellow woods and others, as maple, walnut, oak, etc.	Best rendering of wood grain	G with Commercial Ortho Film
Wood furniture with other colors, as in a room setting	Best grain with good rendering of other colors	K2 or G
LEATHER, LINOLEUM, WALLPAPER:	Natural rendering	K2 or X1
Colored leather with chromium	Lightening of leather so image of metal detail will print	Filter similar to color of leather
Reflections from linoleum	Subdue reflections which obscure pattern	Pola-Screen
PACKAGING: Colored boxes	To separate light reds from other colors	X1 or K2
	Penetration of colored acetate sheeting to show material or detail within	Filter similar to color of sheeting
	To subdue reflections from Kodapak or other clear sheeting	Pola-Screen

windows, and (3) reveal surface and subsurface details usually obscured by reflected glare-light.

Light filter suggestions. A large variety of light filters and kits, equally effective for both color and black-and-white photography, are available in most local photography departments. For best results, carefully follow the manufacturer's directions which accompany the specific light filters. The Eastman Kodak Company recommends the use of the filter chart on page 116 when photographing commercial subjects with type B panchromatic materials.[2]

Remember that all light filters absorb certain proportions of available light. Consequently, it is usually necessary to increase the exposure. Carefully check these factors before snapping the picture. Further information concerning the use of light filters may be obtained by referring to the Kodak data book, *Filters and Screens,* available at most photography stores for approximately 25 cents.

How to avoid common picture-making errors. The following tips will help you avoid many of the common picture-making errors:

1. Wind your film to the next frame as soon as you complete a picture. If you forget to advance the film, a double exposure results, and your pictures will be spoiled.

2. Hold your camera level for the best results. Tipping your camera upwards makes the object lean backwards. Take the picture from a greater distance to prevent tipping it upward.

3. Take time to sight the object carefully through the finder. Don't be a "headchopper."

4. Avoid tipping your camera sidewise, unless you are trying for an unusual shot. It makes the scene appear to be "downhill."

5. Select a simple background in preference to a complicated one. A poor background detracts from an otherwise good picture.

6. To prevent a blurred picture, hold your camera steady when snapping it.

7. A picture of a moving object requires a faster shutter to "stop" action. An ordinary camera may be used if the picture is taken at an angle from a distance.

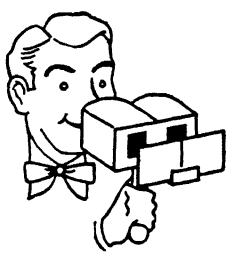
8. Set your lens accurately for each shot, if your camera is equipped with a focusing device.

[2] Kodak Data Book, *Films and Pola-Screens,* Eastman Kodak Company, Rochester, New York, 1944.

9. Before using your camera, wipe the lens carefully to remove dust or moisture. Use lens tissue or a clean soft cloth that will not scratch the lens.

10. Check finger position before snapping the picture. A finger protruding beyond the lens might spoil the picture.

Third-dimension pictures. Third-dimension effects may be obtained in a picture by the use of stereographs and the stereoscope. The stereograph is a card containing two pictures, usually photographed by a camera with twin lens. The stereoscope is a simple device with two separated lenses and facilities for holding the stereograph in place. The learners look into the stereoscope, adjust the position of the stereograph until it is properly focused, and the result is a picture in third dimension. Third dimension provides a more realistic and vivid illustration of the subject. These pictures are made so realistic that a young learner in the lower grades thought he would fall off a cliff while examining a Rocky Mountain scene.



The stereograph and the stereoscope are especially adaptable for use in individual study, and they may readily be combined and used with other visual aids. The exact procedure will be determined by the specific training job.

A large variety of excellent stereographs are distributed by the Keystone View Company for approximately 27 cents each. They include the following units of job study:

Art
Biology
Economics
English and American Literature
English Language
Fine Arts
Furniture
General Science
Geometry
Geography
Health and Hygiene
History
Maps
Physics
Reading
Social Studies
Safety
Science
Transportation

Stereoscopes may be purchased from the same source for approximately $2.95. Other models with built-in electric light and stand cost approximately $15.00.

An instructor can prepare his own third-dimension pictures by the use of a camera such as the Stereo-Realist.[3] This is a 35-mm.

[3] David White Company, Milwaukee. Wisconsin.

camera, employing matched lenses and producing twin transparencies. Observed in a Stereo-Realist Viewer, the scenes are startlingly realistic. Third-dimension pictures may also be obtained by attaching the Stereo-Tach [4] unit to a 35-mm. camera such as the Argus, Contax, Exacta, Eastman 35, Leica, or Perfex. When the finished transparencies are seen in the Stereo-Tach Viewer, the results are similar.

Home-made stereographs can also be prepared by photographing the subject with two cameras, placed alongside of each other, and using identical lenses. Write directly to your camera manufacturer or film company for information concerning the specific arrangement of the cameras.

Full-color prints. Striking, full-color pictures may be directly obtained by using color film in the roll or cut form. Excellent Minicolor prints may be made from Kodachrome transparencies. This is an excellent source of training pictures because the same transparencies may also be used as slides and in the preparation of stripfilm and slidefilm.

Minicolor prints are full-color enlargements prepared from either 35 mm. or bantam Kodachrome transparencies. The three standard sizes are 2¼ by 3¼, 5 by 7½, and 8 by 11 inches. However, larger size prints are available on special request.

The Eastman Kodak Company makes the following suggestions for judging your results with miniature Kodachrome film:

Dense, Dark Transparencies. These are characterized mainly by very dense and off-color shadows that are lacking in detail, and by absence of brilliant highlights.

CAUSE: Underexposure.

TO AVOID: Observe carefully the exposure instructions enclosed with the film.

Thin, Light Transparencies. Thin shadows showing detail but with "washed-out" highlights.

CAUSE: Overexposure.

TO AVOID: Observe the exposure instructions enclosed with the film.

Heavy, Foggy Shadows.

CAUSE: Failure to make allowance in exposure for side-or-back-lighting.

TO AVOID: Where possible, use front lighting with the sun behind the camera. Front lighting usually is preferable for color pictures as the color provides contrast. Consult exposure table included with film for taking side- or back-lighted subjects.

[4] Available at most local photography stores.

Blurred Pictures (All Over).

CAUSE: Camera was moved during the exposure.

TO AVOID: Hold the camera very steady, and hold your breath at the instant the exposure is made; or use a more rapid shutter speed and a correspondingly larger lens stop opening.

Blurred Pictures (Subject Only).

CAUSE: Subject moved too rapidly for shutter speed used.

TO AVOID: When taking rapidly moving subjects, use fast shutter speeds and the correct lens stop opening.

Poor Definition.

CAUSE: Focusing operation was neglected. If a supplementary lens is left on the camera and a distant subject is photographed, the picture will be out of focus.

TO AVOID: Judge or measure the distances accurately and focus carefully; see instructions in the camera manual.

Pictures Misty.

CAUSE: Dirt or moisture on lens or filter.

TO AVOID: Keep the lens and Kodachrome filter clean.

Clear Areas. The film may show some color, usually reddish.

CAUSE: Clear areas at the beginning are caused by exposure of the film to too much light during loading, or by incorrect loading or unloading. Intermediate clear areas occur when the cover is removed from a camera containing a partially exposed film.

TO AVOID: Use care in loading and unloading; see instructions in the camera manual.

Light Streaks in Pictures. Clear or colored flashes on the film.

CAUSE: Back of camera bent or not properly attached, preventing a light-tight fit; or some leak in case or bellows. A severe light leak may produce streaks throughout the roll.

TO AVOID: Return camera to the manufacturer for repair.

Light Circular Spots or Curved Streaks. (A light cloudiness also may be present. These effects are commonly called "lens flare.")

CAUSE: Sun or lamp shining on lens.

TO AVOID: Shield the lens so that direct light from the light source cannot reach it during the exposure.

Yellow Pictures.

CAUSE: Yellow filter (for black-and-white pictures) accidentally left on camera. Too long a time elapsing between exposure and processing also may cause a yellow cast.

TO AVOID: Never use a yellow filter with Kodachrome. Under conditions requiring a filter, use one that is specifically recommended for Kodachrome Film.

Return the film for processing as promptly as possible, and do not leave a partially exposed roll of film in the camera any longer than is absolutely necessary.

Excessive Redness.

CAUSE: (1) Pictures were taken in early morning or late afternoon sunlight. (2) Daylight Kodachrome Film was exposed without Kodachrome Filter *for Photoflood* by regular Photoflood or Photoflash. (3) Daylight Kodachrome Film with Kodachrome Filter *for Photoflood* or Type A Film was exposed by ordinary Mazda illumination.

TO AVOID: (1) Unless photographing the sunrise, sunset, or other special pictorial effects, do not take pictures just after sunrise or just before sunset. (2) Use the Kodachrome Filter *for Photoflood,* or Daylight Kodachrome Film with regular Photoflood or Photoflash illumination. (3) Do not use ordinary artificial illumination for either Daylight Kodachrome or Type A Film.

Excessive Blueness.

CAUSE: (1) Kodachrome Film Type A used in daylight, or with Daylight "blue-bulb" Photofloods, without the Type A Kodachrome Filter for Daylight. (2) Type A Film used in artificial light with Kodachrome Filter *for Photoflood.*

TO AVOID: (1) Use the Type A Kodachrome Filter for Daylight with Kodachrome Film Type A when subject is in daylight, or under artificial light of daylight quality (2) Use *no filter* and exclude all *daylight* when Type A Film is exposed by regular Photoflood or Photoflash Lamps.

Scratches, Finger Marks.

CAUSE: Scratches or abrasions are caused by rough handling, or small particles of dirt in the camera. Moist skin leaves marks on the lacquered surface of the transparency.

TO AVOID: Handle Kodachrome Film by the ends or edges. Clean with a soft brush. If this does not correct the trouble, return camera to the manufacturer for servicing.

Finger marks can be removed from a lacquered transparency by gentle rubbing with Kodak Film Cleaner, applied with the pad included with the cleaner. Avoid scrubbing the transparency and use the cleaner quickly so that pools of liquid do not form on the lacquered surface.

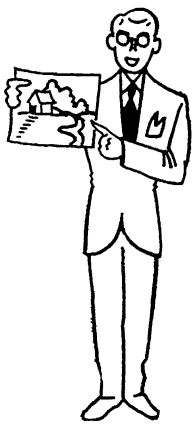
Storage of processed film. Processed Kodachrome Film should be stored in a dark, dry, and cool place. The stored film should be kept away from radiators, steampipes, or locations where it may be subjected to high temperatures.

How to Use Pictures and Photographs

Beautiful pictures that are kept locked neatly in a file are worthless. On the other hand, a training room that is cluttered

with a multitude of heterogeneous pictures will only confuse and distract a trainee.

To obtain the best results, use the smallest number possible of pertinent illustrations. A picture is only valuable in training when it is effectively used to put across a specific point. Generally, the following steps should be observed, with the exact amount of time spent on each step dependent upon the nature of the picture, the trainee level, and the specific training situation:



1. *Prepare trainee.* The majority of pictures and photographs used in training will not arouse instantaneous interest. However, with a little effort, the instructor can put each trainee in a receptive mood. A picture becomes important when a trainee feels that it will benefit him. Interest may also be aroused by telling the trainee what to observe.

2. *Present pictures.* Very few pictures are self-explanatory: the vast majority require clarification as to size, color, distance, speed, movement, temperature, and smell. In order correctly to present a picture for proper understanding, each point must be indicated to the trainee in logical order. Place special emphasis on the more important facts. Sufficient time must be allowed for this process. When a picture is presented to a group of trainees, at first each one sees something different, because the picture is interpreted in the light of his own experience. The instructor must allow for this first glance and then proceed to point out the important points in proper order.

3. *Apply information.* The trainee should be given an opportunity to apply the information obtained from the picture as soon as possible. If the job problem deals with a manipulative skill, the instructor should insist upon correct timing and appropriate technical terms. Informational or attitude job problems should be applied to a specific case.

4. *Check trainee understanding.* The trainee performance, speed, and knowledge should be thoroughly checked by the instructor. All errors that are detected in a trainee's application should be corrected immediately. If complete retraining is necessary, do it immediately. Constructive criticism, tactfully given, is usually appreciated.

5. *Review.* Do not hesitate to reshow a picture, if you think it might clear up a discrepancy or correct an error. Many times another good look at a picture will clarify a complete job. However, specific errors which can be corrected by a picture should be carefully pointed out by the instructor. The trainee must be able to use the information or perform the task accurately. Remember, *if the trainee has not learned—the instructor has not taught.*

Other tips on using pictures. A large number of smaller pictures may be utilized by (1) individual inspection, (2) the bulletin board, and (3) the opaque projector.



Individual inspection. An 8 by 10-inch picture or a photograph may be presented from the head of a training table, or to a small group of trainees. However, a much larger picture must be used if it is to be presented to a large group from the front of the training room. Permitting individual inspection of a picture will solve this problem.

Avoid routing the picture around the training room while the instructor is talking, because this has a tendency to distract attention. Rather, secure a similar picture for each trainee, or divide the trainees into small groups of three or four and allow them to scrutinize each picture carefully.

Bulletin board. After presenting a training picture to the group, it may be further utilized by exhibiting it on the bulletin board. This will permit a follow-up activity on the part of the trainee who desires to re-examine a picture.

Occasionally interest may be aroused by displaying the training picture prior to the beginning of the lesson. However, this technique must be carefully handled in order to avoid cluttering the bulletin board and distracting the attention of the trainee.

Opaque projector. As has been pointed out in another chapter, the opaque projector is particularly adapted to the needs of the instructor, especially when it is necessary to present a small picture to a large group. Any picture may be projected on a

screen, enlarged many times, for group observation. Refer to the chapter "Opaque Projector" for specific directions.

In some training situations, it will be possible to utilize pictures by combining several methods of presentation. An initial presentation, using the opaque projector to enlarge the object (to facilitate group presentation), may be followed by the distribution of similar pictures for individual inspection. Then the picture may be exhibited on the bulletin board for future reference by the trainee An ideal set-up would also provide an opportunity for the trainee to refer to the picture after it is placed in the file.

Home-Made Pictures

There is an unlimited supply of pictures that may be used to illustrate most training jobs. However, nothing can take the place of a home-made picture which has been prepared to illustrate a specific training situation. The following training situations may be effectively illustrated by instructor-trainee-made pictures.

On-the-job activities. All trainees like to be photographed on the job. Not only does this give the trainee added pride in his work, but it may also be used in remedial and corrective training. Pictures of trainees on the job are also excellent incentives for securing trainees in the program.

Classroom projects. Training projects that are developed in a classroom may be photographed for future reference. They arouse interest when exhibited in the library or on the bulletin board. Pictures of window displays and counter layouts arranged by trainees may be exhibited in a contest at the end of the year, with awards for outstanding jobs.

Store and plant projects and displays. A wide-awake store or plant manager will photograph outstanding promotions, special sales, layouts, window displays and other ideas that pulled traffic, increased production, or increased sales. A file of these pictures can be valuable for future planning, since, in the following year, it will not be necessary to start from scratch. Merely "pull the file" for a proved idea.

Attractive pictures can be taken at night, or of interiors, with all lights on. Follow these directions:

1. Use a camera with a time-exposure setting.
2. Load camera with double-x panchromatic film.

3. Camera must be kept absolutely still. Place it on a tripod or any other steady support.

4. Open "time exposure."

5. Use one-, two-, or three-minute exposures. After the trial test, use the time exposure which gives the best picture.

Field trips. Photographs of a complete field trip are educational, interesting, and exciting, especially when the trip is being reviewed the following day. It presents an opportunity for further investigation of important points observed during the trip, and it also serves to recall items that might have been overlooked. A file of this type of material will prove to be a wealth of source and reference information.

Progress and events. An interesting book, or manual, may be prepared by highlighting the outstanding events and activities of a training group. Both group and individual pictures, showing the trainee on the job and in the training room, are extremely effective. Pictures of field trips, outstanding trainee jobs, prize winners, club officers, graduation scenes, group plays, outings, dinners, and dances add a personal touch to a class book. Be sure to keep the negatives. There will be many requests for duplicate prints.

DO's for the Use of Pictures and Photographs

DO utilize the countless number of excellent pictures and photographs available for training.
DO collect pictures from all available sources.
DO mount pictures on suitable backgrounds.
DO label each picture to facilitate filing.
DO protect scarce and frequently used pictures with a cellophane cover.
DO prepare your own photographs to illustrate specific training jobs.
DO prepare the trainee before presenting the picture.
DO show only large pictures from the front of the training room.
DO use a small picture for individual inspection or with the opaque projector.
DO use the opaque projector in presenting pictures to a large group.
DO combine techniques to exhibit a picture to its best advantage.
DO point out each important point in the picture.
DO discuss or apply the information in the picture as soon as possible.
DO test the trainee's understanding of the picture.
DO review the job problem by reshowing all pertinent pictures.

DO use pictures with other related training aids.
DO follow up the job problem by displaying pictures on the bulletin board.
DO photograph field trips to facilitate follow-up study.
DO photograph trainee progress and special events.
DO use home-made pictures for publicity work.
DO catalogue and file all pictures and photographs for easy reference by trainee and instructor.



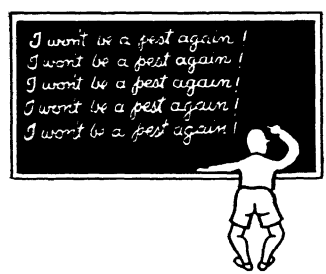
Courtesy of R. H. Macy & Co.

USING THE BLACKBOARD IN A SUPERVISORY TRAINING CONFERENCE.



The Blackboard and Bulletin Board

The blackboard. The blackboard is probably the most universally used visual aid. Properly used it may be of tremendous value in all kinds of training.



As a "point clincher" the blackboard is unequaled. The important points of a subject or problem may be driven home with a piece of chalk and a blackboard. You have two opportunities of putting your story across when you present it verbally and then place the key points on a blackboard.

The following list of items, for which a blackboard may be used, indicates the versatility and effectiveness of this visual device.

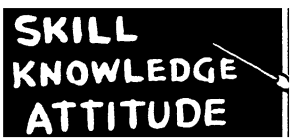
Blackboard Point Clinchers

Drawings
Sketches
Maps
Graphs
Diagrams
Technical words
Definitions
Key words
Outlines
Reviews
Daily problems
Assigning new problems
Problems to be solved
Making announcements
Company rules and policies
Giving directions
Illustrating procedures
Testing
Training records
Tracing screen

How to Use the Blackboard

Blackboard work should be simple and brief. Copying lengthy outlines or lists of subject matter is a waste of time to instructor and student. If it is important for the trainee to have a copy of this material, it should be duplicated and distributed.

The blackboard is similar to a store window. Everyone knows that an overcrowded, dirty, and untidy window display has little stopping value as compared to one that is clean and neat and displays a few well-chosen items.

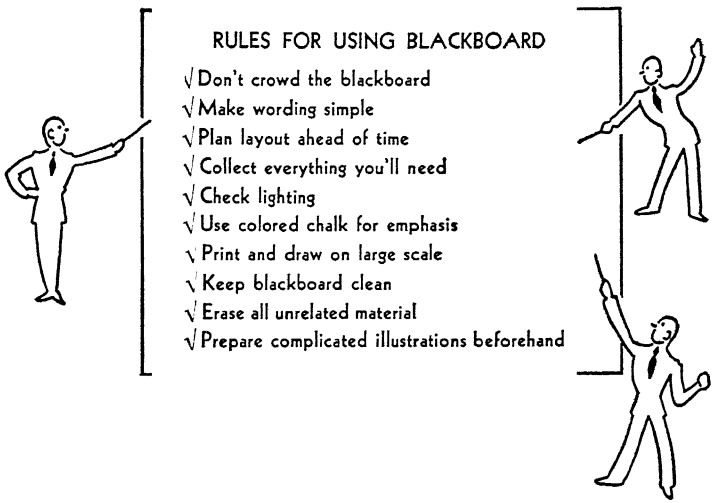


The following rules for using the blackboard should definitely increase its effectiveness as a visual aid:

1. Don't crowd the blackboard. A few important points make a vivid impression.
2. Make the material simple. Brief, concise statements are more effective than lengthy ones.
3. Plan blackboards ahead. Keep the layouts in your training plan folder.
4. Get together everything you need for the blackboard before the group meets—chalk, ruler, eraser, and other items.
5. Check lighting. Avoid blackboard glare. Sometimes it will be necessary to lower a shade and turn on the room light.
6. Use color for emphasis. Chrome yellow and pale green chalk are more effective than white chalk.
7. Print all captions and drawings on a large scale. The material must be clearly visible to each trainee.
8. Erase all unrelated material. Other work on the blackboard distracts attention. Use a board eraser or cloth, and not your fingers.
9. Keep the blackboard clean. A dirty blackboard has the same effect as a dirty window.
10. Prepare complicated blackboard layouts before the group meets.

Presenting Blackboard Material

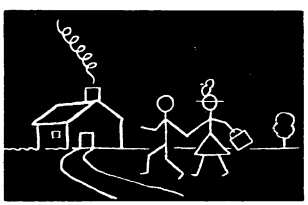
Accent the positive. During the presentation of the subject, accent the positive at the right moment. Place the material on

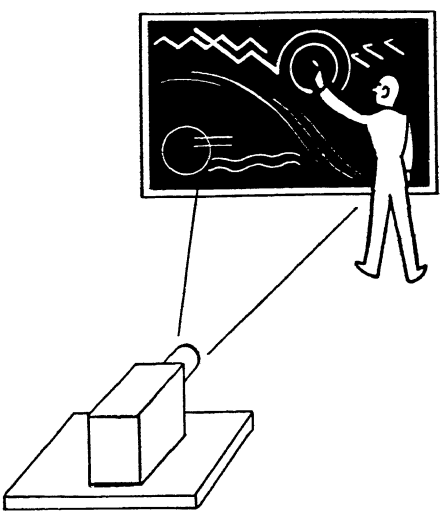


the blackboard to clinch the idea when it will do the most good. For more emphasis:

1. Underline statements to focus attention.
2. Use chrome yellow or pale green chalk.
3. Stand to one side of the blackboard.
4. Use a pointer.

Chalk talks. Make your chalk talk—and you don't have to be

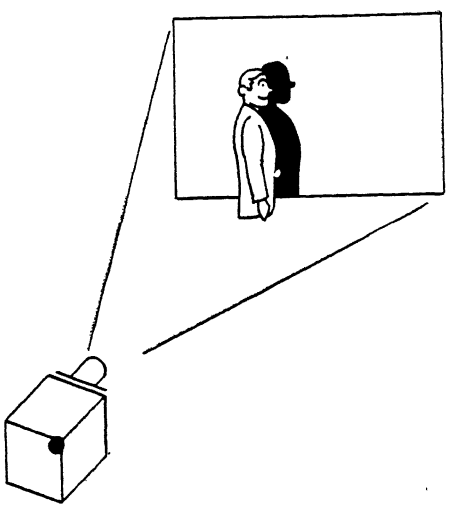




an artist. Use stick figures to illustrate your subject matter whenever possible. A circle for the head, a long line for the body, and shorter ones for the arms and legs, are all that is necessary. The simpler the drawings, the better. Work out your chalk talk before presenting the subject.

Tracing screen. Complicated illustrations may be placed on the blackboard with the aid of a projector. Trace the image with chalk as it is projected on the blackboard instead of a screen. If you are using a picture from a motion picture, it will be necessary to stop the machine and refocus the "still" on the blackboard. The slide, stripfilm, and opaque projector are handled in the usual manner. Any picture may be placed on the blackboard in this fashion.

The silhouette of a trainee, for example, may be placed on the blackboard for training in proper hair style, posture, and general appearance.



For silhouette work the following steps are suggested:

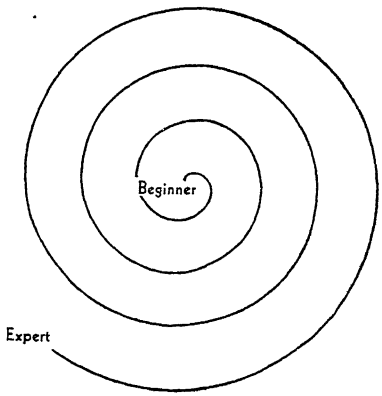
1. Focus projector light on desired space on blackboard. The slide and opaque projector are best, but the others are also suitable.
2. Darken area near blackboard if necessary.
3. Place trainee between the projector and blackboard. Move him back and forth until the desired silhouette appears on the blackboard.
4. Trace the outline of the silhouette with chalk.

This tracing technique opens up many new avenues for illustrating subject matter in various fields. The wide-awake instructor will find many dramatic ideas for vitalizing his presentation.

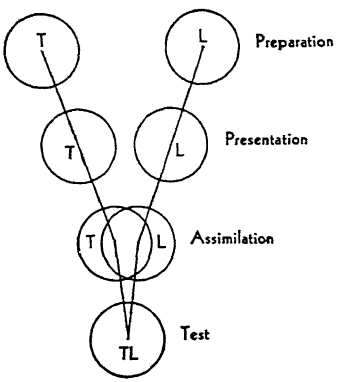
An Example of the Use of the Blackboard

Many employees and executives of large organizations have taken such courses as Job Instructor Training, Job Methods Training, and Human Relations Training. The value of these courses is recognized by thousands of trainees. Much of the instructor efficiency in these courses was due to the skillful use of the blackboard by trained people.

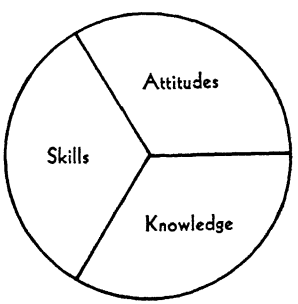
In Texas, the State Board for Vocational Education [1] employed the following diagrams in their Job Instructor Training courses. Sometimes the illustrations were placed on the blackboard before the group met. However, when they were drawn during the training session, the actual process of drawing usually gave more life and meaning to the diagrams.



The illustration at the left shows the importance of the instructor getting on the learner's level when he instructs. The center of the diagram represents the beginner who gradually develops on his job until he becomes the expert on the outer rim. The trainer must determine what stage the learner has reached and start his training at that point. Too many trainers start training at their own stage of learning, and, consequently, fail to teach the learner.



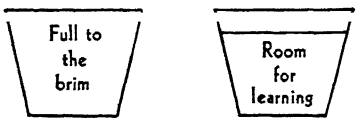
The illustration at the right is a diagrammatic representation of the four basic steps in training, whereby the trainer transfers what he knows to the learner until the learner knows what the trainer knows. The important point to bring out in this diagram is the coming together of the trainer and the learner in the third step, the trainer taking part in helping the learner to assimilate and apply information.



The familiar pie graph can be used effectively in discussing types of training situations under HOW TO GET READY. The entire circle represents the learner's background, including skills, knowledge, and attitudes. Training is required in all three of these types of learning.

[1] Illustrations courtesy M. A. Browning, Supervisor Business Education, State Department of Education, Austin, Texas.

The purpose of the figures at the left emerges in the act of drawing. The idea to portray is that of attempting to put more water into a bucket that is already filled to the brim. Of course the water overflows and nothing is accomplished. The only way to get more water in is to get some of it out by kicking the bucket or by some equally drastic method. (A vivid word picture should accompany the drawing of this diagram.) In like manner, it is sometimes necessary to get old ideas out of a learner's head to make room for new information.



Another good analogy is the process of making more room in a basket of potatoes by shaking down the basket. The process of shaking dislodges the potatoes and, at the same time, makes room for new ones.



"The learner should be lifted by training and good relationships to a point where he feels that he is being assisted to do a better job."

DO's for Using the Blackboard

DO use blackboard as a "point clincher."
DO make all drawings and captions on a large scale.
DO prepare complicated layouts before group meets.
DO use yellow or pale green chalk for emphasis.
DO underline important facts.
DO keep blackboard work neat.
DO use a ruler and compass.
DO avoid "blackboard glare."
DO stand to one side of the blackboard.
DO use a pointer to focus attention.
DO remove all unrelated material with board eraser.
DO prepare chalk talks for job problems.
DO clean blackboard regularly.
DO use blackboard as a tracing screen.
DO vitalize blackboard with projected material.

The Bulletin Board

An effectively used bulletin board is much more than a piece of cork or a burlap cloth upon which odds and ends are placed.

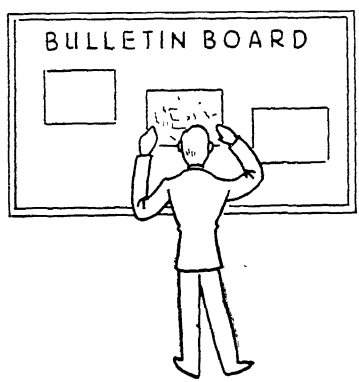
A good bulletin board is a *vital animated* tool when used to arouse trainee interest, develop efficiency, and to follow up blackboard work and other training aids.

How to Use the Bulletin Board

Bulletin-board items. Bulletin boards may be used to display numerous items, such as:

1. Personal news
2. Announcements
3. Booklets and brochures
4. Bulletins
5. Cartoons
6. Charts
7. Diagrams
8. Posters
9. Maps
10. Newspaper clippings
11. Drawings
12. Graphs
13. Notices
14. Pictures
15. Pamphlets
16. Photographs
17. Post cards
18. Models and specimens
19. Subject outlines
20. Trainee progress records

Bulletin-board system. Placing a conglomeration of the material listed above on a bulletin board would be disastrous. The instructor should:



1. Collect suitable illustrations for instructional projects or problems. Eventually he will have enough bulletin-board material to cover nearly all subjects.
2. Classify and file material for use at the right time. Be alert for new materials and do not hesitate to discard the old ones.
3. Select illustrations pertaining to the specific subject or area under consideration.
4. Arrange illustrations on bulletin board in an interesting manner.
5. Prepare a title and brief description.
6. Use color harmony and balance.
7. Exhibit or refer to bulletin-board pictures during instruction time.
8. Encourage trainees to observe and contribute to the bulletin board.

Arousing trainee interest. A trainee's interest may be aroused by simply placing his name on the bulletin board; a chart showing his training progress is even more effective. Listing the training tasks and dates for each trainee on the bulletin board at the beginning avoids confusion later.

Interest may be aroused in a subject by placing an announcement on the bulletin board pertaining to it. For example, "A motion picture will be shown tomorrow on 'How to Increase your Efficiency.'" Some training films are accompanied by "blow-ups" suitable for this purpose.

Another method for arousing interest in a topic is to arrange an interesting bulletin-board display several days prior to the introduction of new subject matter. The display must have "reader interest" and sufficient time should be allotted for the trainee to observe it.

Developing subject matter. The illustrations which are used on the bulletin board may be removed from the display and used during your subject-matter presentation.

If the bulletin board is portable, place it in front of the training room, and if the illustrations are large enough for everyone to see, it will not be necessary to remove the pictures. On the other hand, if the illustration is small and the details important, it will be necessary to use the opaque projector. However, in most cases this will not be necessary. It is also helpful to have the illustrations arranged on the bulletin board in the proper sequence, that is, the order in which you will present the training steps to the group.

Stand to one side when presenting bulletin-board pictures, and use a pointer to direct attention. Illustrations not pertaining to the specific subject matter being presented should not be placed on the same bulletin board.

"Keep your eye on the ball." The bulletin board offers an excellent opportunity to follow up the use of the blackboard. For example, an important blackboard outline may be transposed to the bulletin board in simple chart form at the completion of the subject under discussion. Illustrations pertaining to this specific outline may also be displayed.

Flash cards, store pictures, posters, graphs, and diagrams that were used during the subject presentation may be reviewed advantageously when displayed on the bulletin board.

Subject matter presented by motion pictures, stripfilm, slides, and the opaque projector may be reviewed by displaying related material on the bulletin board immediately after the showing.



The *follow-through* is important in sports, but even more important in good job training. The bulletin board is your opportunity for a follow-through.

Bulletin board titles. Interesting titles may be prepared by drawing or printing them, cutting them from magazines and newspapers, and by using the opaque projector. The opaque projector offers an opportunity for duplicating attractive and complicated titles by projecting the desired material on a sheet of paper and then tracing the image on it.

How Trainees May Contribute Items

Training rooms should have more than one bulletin board, one being devoted to trainee use. At the beginning of the training period, prepare a list of important general subjects or topics and encourage the trainee to select one that especially interests him. Designate specific dates for changing the bulletin board and allow the trainee sufficient time to collect material. Give a few points on the use of the bulletin board and let the trainee proceed to express himself. You will be amazed by some of the original and creative displays that will be developed by trainees.



The following directions are suggested for trainee bulletin boards:

1. Remove old display.
2. Clean and dust bulletin board.
3. Set up display.
4. Prepare interesting title.
5. Relate all illustrations to the specific subject or topic to be considered.

6. Caption all illustrations.
7. Keep bulletin board neat.
8. Make it tell a story.

How to Make Bulletin Boards

Beautiful glass-enclosed bulletin boards are comparatively inexpensive, but a simple home-made one is just as effective and costs very little.

Bulletin boards can be made of cork, soft wood, burlap cloth, monk's cloth, heavy brown wrapping paper, masonite board, Celotex, and numerous other fiber boards. Cork is preferable, but the others are also suitable. Add color by occasionally painting the bulletin board with pastel colors or water paint. Friar's cloth and billiard cloth give interesting effects when stretched over a soft wood backing.

The size of the bulletin board will depend upon the size of your training room.

It should be placed at least three feet above the floor in an area that is well lighted at all times. In some training rooms, blackboards have been successfully replaced with bulletin boards at each end. This relationship between the blackboard and bulletin board makes it very easy to correlate the work on each.

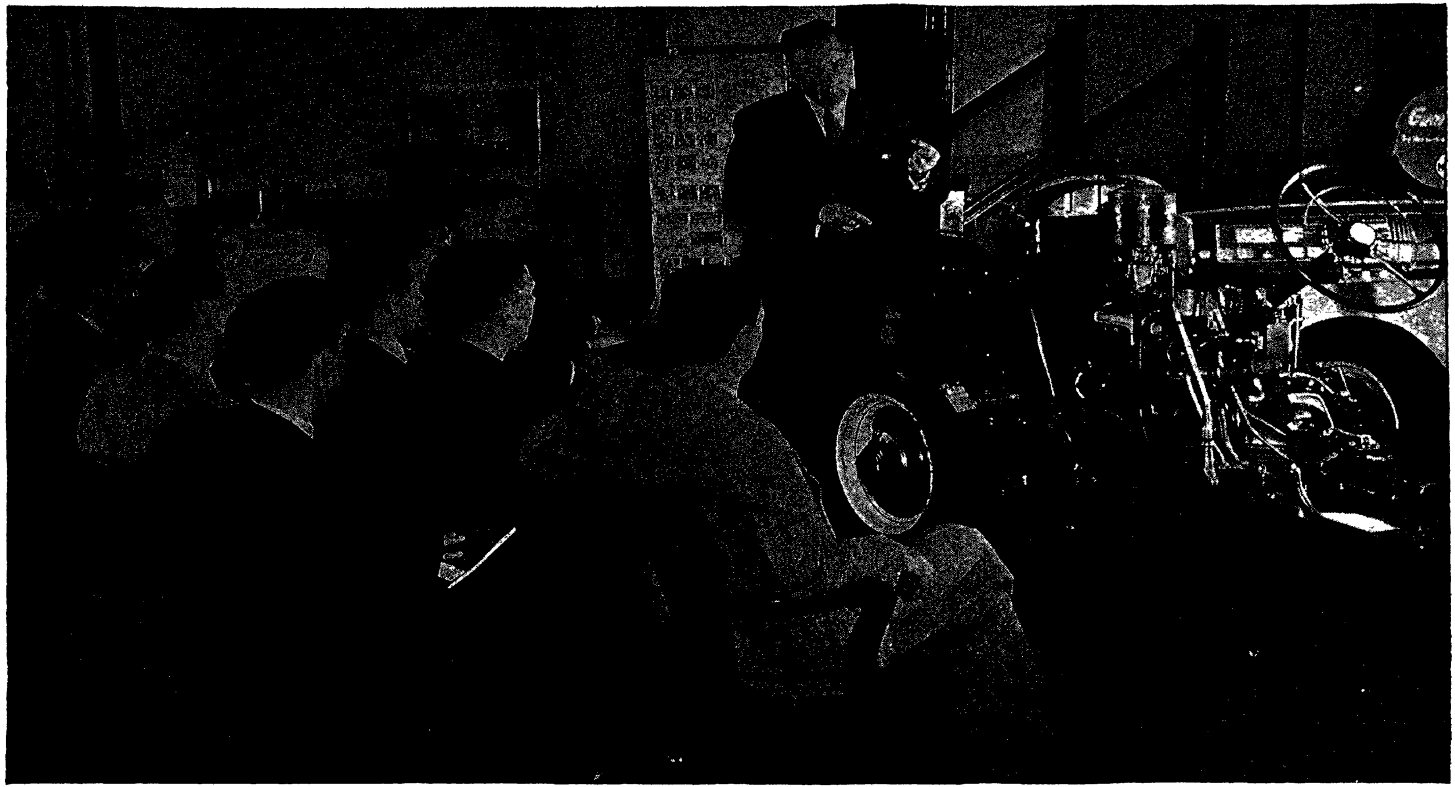
The bulletin board may be attached to the wall by means of a small frame, hooks-and-eyes, wire, or may replace slate space in a blackboard.

A portable bulletin board possesses an adaptability that is desirable in many training situations: it can be easily moved from one section of the room to another to give specific emphasis to the topic under discussion.

DO's for Using the Bulletin Board

DO capitalize on all bulletin board space in training room.
DO use bulletin board to arouse trainee interest.
DO use bulletin board to develop subject matter.
DO use bulletin board to follow through other training aids.
DO collect suitable material.
DO classify and file material.
DO use pertinent illustrations.
DO arrange pictures in orderly and interesting manner.
DO create original titles.
DO use color harmony and balance.

DO caption all illustrations.
DO change material frequently.
DO make bulletin board tell a story.
DO make your own bulletin boards if none are available.
DO make them large enough.
DO place them where they can be easily seen by all trainees.
DO experiment with portable bulletin boards.



Courtesy of Socony-Vacuum Oil Co.

USING THE CUTAWAY MODEL OF A POPULAR CAR TO EXPLAIN THE *PART* THAT THE *CARBURETOR* PLAYS IN THE FUNCTION OF AN *AUTOMOBILE*.



Objects, Specimens, and Models

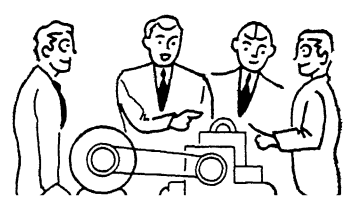
"A BIRD in the hand is worth two in the bush" is an old adage, but it takes on new meaning when it is applied to the use of objects, specimens, and models in effective training procedures.

Objects. This group includes anything from helicopters to "junk" jewelry. The term refers to a collection of individual "objects."

Specimens. A specimen is a small piece, segment, part, or sample of the real object, or the material used in the preparation of it.

Models. Models include not only the Powers and Conover type, but also replicas of significant units used in manufacturing or operation, usually copied on a smaller or larger scale.

These training aids are powerful interest-arousing devices that possess the capacity of bringing into play all five senses—touch, sight, hearing, smell, and taste. An instructor who capitalizes on as many of these senses as possible, increases the efficiency of his training proportionately.



It is not necessary to bring a camel or a llama to a training room to study its hair—a small specimen of it will suffice; nor is it practical to set up a B-29 bomber in the training room when the desired results can be obtained by using the engine only or a small model of the aircraft. When it is physically impos-

sible or impractical to use the real object in the training room, a model or specimen will do the trick. In fact, in some cases these aids are more effective than is the actual object.

Sources of Objects, Specimens, and Models

First utilize the sources in your own organization or community. Local merchants, manufacturers, and processors usually extend their full co-operation in an effort of this type. After exhausting the possibilities in your own training area, it will be necessary to contact outside concerns that use, collect, manufacture, process, or sell the material required for the specific training job.

Do not overlook the trainee as an excellent source of material. He may already possess the things needed, or may know where to find them.

Sources of objects. Many inexpensive, staple objects should be purchased outright and made a permanent part of the training room. However, the majority of objects may be obtained from local merchants, manufacturers, or producers on a loan basis. The instructor should assume the responsibility of protecting the objects against damage, soiling, and theft. Keep a careful record of all borrowed items, and return them as soon as they have served their purpose.

Sources of specimens. A letter to almost any manufacturer or processor in the country will bring excellent specimens of his products, and occasionally, a complete exhibit will be sent free of charge. However, a large number of specimens may be obtained in your own local plants, farms, and stores. Invite the assistance of the trainees to facilitate the collection of these specimens.

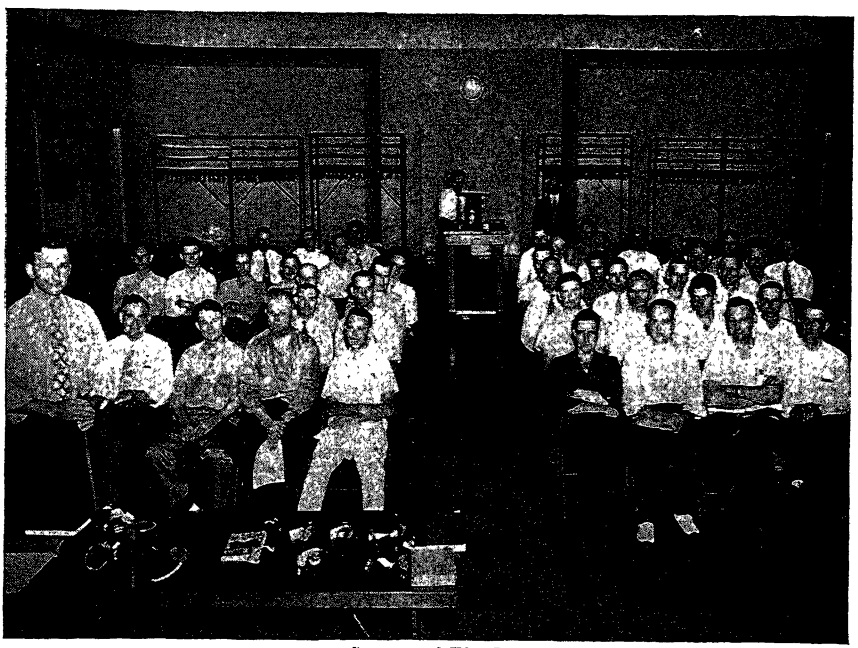
State and local museums, lending libraries, and universities maintain and distribute large collections of specimens.

Sources of models. Models are not as plentiful as objects and specimens, and in many cases, it will be necessary to make your own models.

Lending libraries, universities, and museums such as the following, have large collections of excellent models and exhibits. Most of their material may be obtained free of charge or for a small shipping fee.

The Commercial Museum, Philadelphia, Penn.
American Museum of Natural History, New York, N. Y.
Field Museum of Natural History, Chicago, Ill.

Each branch office of the National Cash Register Company is equipped with a complete set of store models, which are used chiefly to assist merchants in store layout, but which also may be used advantageously in other phases of store training.



Courtesy of Visual Education Division, General Electric Co.

CORRELATING OBJECTS, SPECIMENS, AND MODELS WITH A SOUND SLIDEFILM PRESENTATION.

Other potential sources of models are equipment and fixture companies, architects, stores, and industrial units that have just been remodeled or built, and numerous manufacturers who have prepared models to facilitate the sale of their products.

How to Prepare Objects, Specimens, and Models

The talents of the individual instructor and trainee should be utilized to the fullest extent in the preparation, mounting, and preserving of these aids.

Commodities and similar objects do not require special preparation, since they are obtained in finished form. However, there should be ample space for displaying and storing this material in the training room. Equipment and other facilities will be discussed in the following chapter.

In order to facilitate accessibility, filing, and use of specimens, they either should be placed in clearly marked cardboard cartons, glass, and cellophane containers, or should be mounted. The type of mounting used will depend to a large extent on the kind of specimen. The following directions will enable the instructor to mount adequately the majority of specimens used in training situations:

Mounting specimens. Proper mounting of specimens includes the following procedures:

1. Secure shallow cardboard box.
2. Cut a piece of stiff cardboard to fit snugly in the bottom of the box.
3. Lay out the specimens on the sheet of cardboard in an artistic fashion.



Courtesy of Sears Roebuck & Co.

DEMONSTRATION AND PRACTICE WITH AN ACTUAL MODEL.

4. Mount specimens, such as cotton, wool, silk, and other soft items directly on the cardboard with a large needle and thread. Metal, plastic, wood, and other solid items may be mounted by tying them to the cardboard with heavy thread or thin wire. Use a pointed instrument, such as an awl or an ice pick, to prepare neat

holes for the thread or wire. Tie the knots on the back of the cardboard. Delicate specimens may be mounted on a thin layer of absorbent cotton which has been placed on the sheet of cardboard in the bottom of the box.

5. Label each specimen. Typewritten labels are attractive and effective and may be pasted directly on the sheet of cardboard near the specimen.

6. Place the sheet of cardboard in bottom of the box. If necessary make it secure with paste, glue, or scotch tape.

7. Fragile specimens may be protected by covering the top of the box with a sheet of cellophane. Carefully fold the cellophane over the sides of the box and attach it with scotch tape.

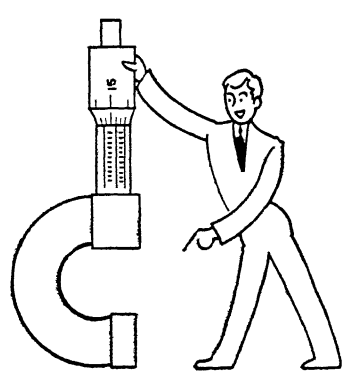
8. Place a clearly visible label on the box to identify the contents.

9. Cover the box with the lid for storing.

10. Use a storage place that will protect the specimen boxes from being crushed.

Specimens such as textile swatches, for example, which require close inspection and trainee handling for complete assimilation, might better be mounted on individual 3 by 5 or 5 by 7-inch index cards. Place the specimen in the upper left-hand corner of the card. Glue or paste only the upper edge, to permit the lower end to hang free. This will allow the trainee to feel or examine the sample minutely. The remainder of the card should contain (1) name of fabric, (2) kind of fiber, (3) type of weave, (4) brief description, (5) advantages, (6) disadvantages, and (7) uses.

Kinds of models. The models used in training may be divided into three general groups: (1) solid, (2) "X-ray," and (3) working.



Solid models are used chiefly for their external features, such as developing a store layout with small-scale counters and fixture models.

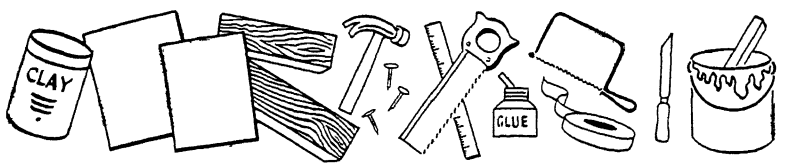
"X-ray" models are used chiefly to reveal internal construction, such as a cross-section model of a motor showing its hidden features.

Working models are used chiefly to demonstrate operation or processes, such as model vacuum sweepers and washing machines.

In some cases, such as automobile motors, the model is encased in glass or made with a cut-away part.

Good "X-ray" and working models are difficult to make and usually require the services of an expert model maker. However, the solid models are easy to make, the only requisites being skill, ingenuity, and imagination. The model should also have (1) a convincing resemblance to the actual object, (2) a suitable size for the training purpose, (3) a durable construction, and (4) it should be convenient to handle.

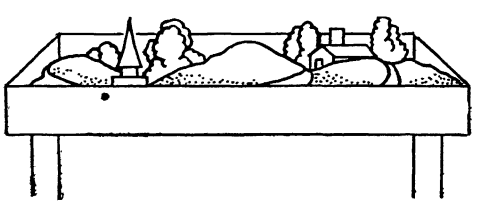
Materials. Models can be built from water clay, plasticene, heavy cardboard, wood, wallboard, or plywood. In many cases,



scraps of these materials, which would ordinarily be discarded, are adequate for the preparation of smaller models. Select the material which equals the desired unit scale in thickness. For example, if the scale were ¼ inch to 1 foot and the object were 4 feet high, the best material to use would be 1 inch thick.

Tools. Most models can be constructed with a ruler, pencil, small nails, hammer, knife, saw, and glue. A coping saw, similar to the one used in cutting "jig-saw" puzzles, would be excellent.

Sand tables. Agricultural, mining, geographical, and numerous other projects dealing with terrain and topographic layout may be vividly illustrated by the use of a simple sand table.



The sand box or tray should be built of suitable lumber and should be tarred before the damp sand is put in to prevent warping. The exact size of the box will be determined by the specific training needs. A useful size for smaller job problems is 3 by 4 feet, and 8 to 10 inches deep; for larger projects, the box or tray should be 5 by 10 feet or larger. Other necessary materials are plasticene; water clay or sand that can be molded when wet; shovel; rake; sprinkling can; large

bucket of water; bucket for mixing sand and water; string; thumbtacks; blue and green chalk; assorted sizes of wooden blocks to represent buildings; and pieces of toy equipment, such as trucks, tractors, wagons, and boats.

Terrain. Suitable terrain is selected on a map which is divided into squares and numbered as suggested in Chapter 5. Similar squares are marked on the sand table by cords fastened at the proper intervals along the side of the box. The important features, such as hills, valleys, streams, and roads are then molded in the sand.

Buildings and other outdoor units. These can be constructed from thin wood, wallboard, cardboard, or clay to represent the size and shape of the originals.

Woods. Masses of trees can be fashioned from sponges, modeled clay, or any scrap materials. Pieces of cardboard or wood, roughly shaped with a knife, are satisfactory. If the model is large scale, the trunks and branches of the trees can be made by twisting together several strands of picture wire for the trunks, splitting and twisting the ends for the branches; or actual branches of shrubs that resemble tree trunks and limbs can be used. Steel wool or sponges can be cut into foliage shapes, and fastened onto the branches. A more realistic effect is obtained by spraying the foliage masses with shellac, sprinkling them with sawdust, and spraying them with green paint.

Fields. Open fields can be readily simulated by roughening the surface of the clay, or by sprinkling it with sawdust, and then covering it with suitable colors or coating it with chalk.

Water. Oceans, lakes, streams and other bodies of water can be represented by covering the area with a mirror, glass, cellophane, or by painting the area blue.

Trucks, tractors, boats, and other equipment. Toys that are suitable for use in the sand box may be frequently purchased. However, if they are not available, they can be constructed from wood, metal, rubber, cardboard, and other similar materials. Local variety stores carry a multitude of such objects.

Store layout project. A simple set of models may be prepared for use in a plant, farm, or store layout training project by using the following directions.

1. Use scale ¼ inch to 1 foot.
2. Cut piece of smooth cardboard to represent floor.

3. Rule guide lines on cardboard horizontally and vertically to show scale and facilitate spacing.

4. Measure off desired lengths on 1-foot moulding, wallboard, or plywood.

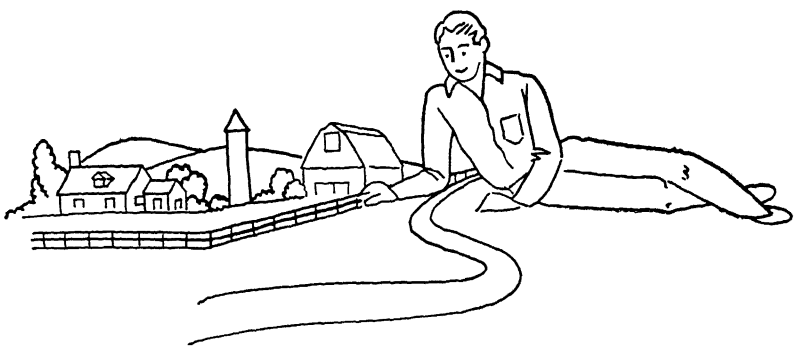
5. Cut with saw, and then smooth the edges with sandpaper.

6. If desired, the models may be varnished, painted one color, or painted to represent different types of objects or equipment.

Dominoes, checkers, building blocks, metal construction sets, and many other toys may also be adopted for use as models in store training.

How to Use Objects, Specimens, and Models

Like other training aids, the use of objects, specimens, and models must be carefully planned. Casual observation of these items is not sufficient for effective training.



Complete utilization of these training aids requires maximum trainee handling and operation.

Objects, specimens, and models become even more potent in their effects when used with other training aids, such as pictures, maps, charts, graphs, diagrams, posters, merchandise manuals, field trips, and projected material.

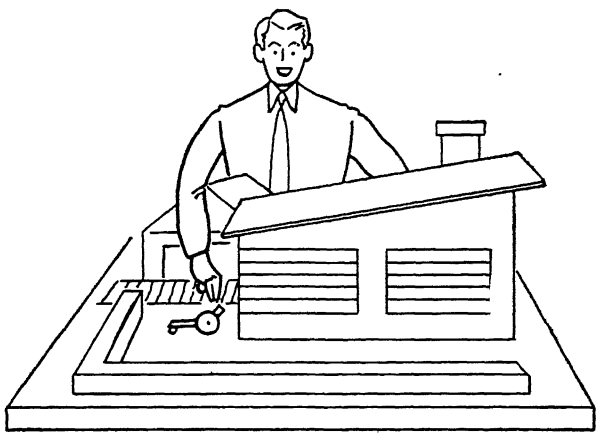
In order to facilitate the use of objects, specimens, and models, they should be placed in boxes, carefully labeled, and stored in an easily accessible cabinet or closet in the training room. Flat specimens that are mounted on cards may be placed in a vertical file. Be sure to note all materials in the visual-aids column in the job training plans.

In general, the following steps should be followed:

1. *Prepare trainee.* The experienced instructor will permit the trainee an initial period of exploration, but as soon as the training starts, the attention of the trainee must be directed to the specific points or steps.

The trainee should know (1) why the training aid is being used, (2) what specific points to observe, and (3) how this knowledge will benefit him. Informing the trainee that he will be tested at the completion of the training job is an added stimulus for attracting attention and arousing interest.

2. *Present object, specimen, or model.* Present the training aid so that it is clearly visible to each trainee. Step by step point out



each important item in a logical order. Demonstrate and clarify each point so that it is distinctly understood by the trainee. Accent principal steps and ideas. Remember, there is a limit to how much the trainee can absorb at one time. It is more important to put one skill or idea across perfectly than several inadequately.

3. *Apply knowledge.* After the training aid has been presented, it should be applied or discussed as soon as possible. If the training job deals with a manipulative skill, the trainee should perform the job and explain each step. The instructor should also insist upon correct timing and the use of appropriate technical terms. Informational and attitude-type training should be thoroughly discussed to assure trainee understanding.

4. *Test trainee.* The trainee's application or discussion should be followed by a formal or informal test, which can be either oral or written. His performance and speed should be thoroughly checked and all errors should be detected.

5. *Review job training.* All errors in performance, knowledge, and attitudes should be corrected immediately in a constructive manner. Do not hesitate to reshow the object, specimen, or model to clear up a point. If complete retraining is needed—give it without delay. The most significant thing is whether the trainee can perform the job accurately. Remember, *if the trainee cannot perform, the instructor has not taught.*

DO's for the Use of Objects, Specimens, and Models

DO vitalize the store training job with objects, specimens, and models.
DO use the actual object whenever possible.
DO collect specimens and models from all available sources.
DO prepare specimen sets and models that will illustrate the specific training job.
DO permit the trainee to construct models and develop his own specimen sets.
DO prepare the trainee before presenting the object, specimen, or model.
DO make the objects, specimens, and models appeal to as many of the five physical senses as possible.
DO demonstrate all objects so that they are clearly visible.
DO use a spotlight or desk lamp to illuminate the training aid.
DO speak up to the trainee and not down to the aid.
DO demonstrate one aid at a time.
DO complete the demonstration before permitting the trainee to handle or manipulate the training aid.
DO use pictures, diagrams, and other training aids to illustrate the equipment in actual use.
DO avoid misconceptions by discussion or application at the end of the demonstration.
DO test the trainee's understanding of the job.
DO repeat the demonstration until the trainee thoroughly understands it.
DO carefully store objects, specimens, and models in adequate containers.
DO catalogue and file each training aid for easy reference.



Courtesy of International Harvester Co.

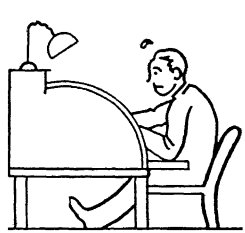
A Practical Training Laboratory Providing Individual Attention.

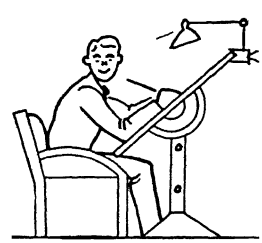


Training Laboratory

"YOU DON'T need to print no letters for me; I kin read writin'!" was the way many business men reacted to the typewriter in 1880. Fortunately, few instructors feel this way about equipping a training room so that it can operate on a functional basis.

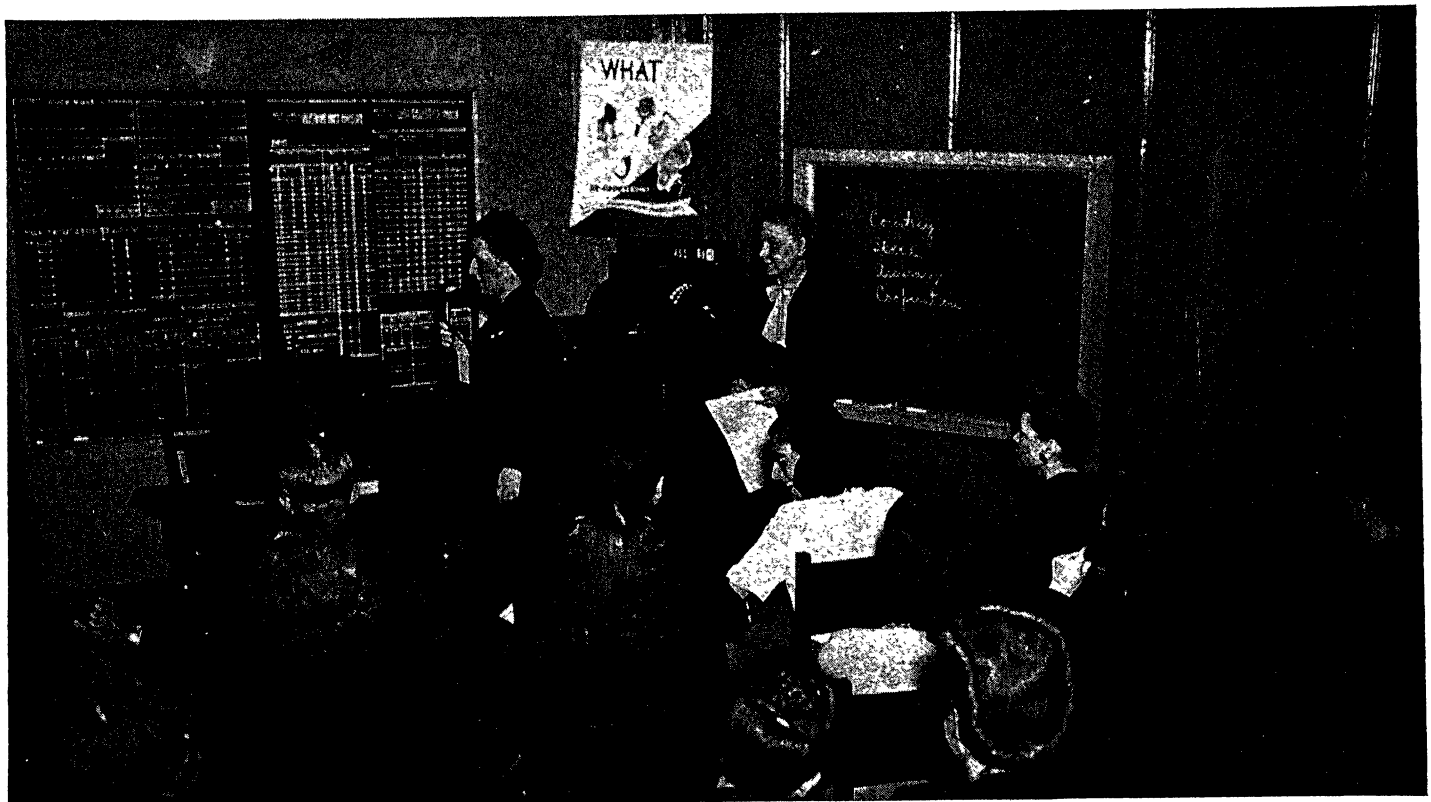
Effective training is extremely difficult in a room equipped, for example, with the old, permanent, flat-top desks. Most trainees





lack the necessary sense perceptions and "know-how," which can only be developed by specific training with actual equipment in a genuine job atmosphere.

In order to measure up to the "skill" training that is required in most jobs, the trainee must have an opportunity to acquire dexterity and experience with the materials and equipment used in his specific job. An ideal training situation would provide all the necessary material, supplies, tools, and equipment used in the particular trade or occupation.



Courtesy of Joseph Horne Co., Pittsburgh

A "Playback" Machine for Voice Development.

Sample Training Laboratory Check List

The following check list of layout, equipment, fixtures, supplies, and tools should be used in setting up a laboratory for general store training. For training in shop practice, agriculture, home economics, or any other training area, appropriate training materials should be provided.

Layout and Equipment

Receiving space	Change drawer or cash register
Marking table	Marking machine
Stock space	Wrapping paper roller
Shelving	Cord holder
Counter	Tape receptacle
Show case	Bag container
Store window	Box container

Fixtures

Card holders	Dress stands
Ticket holders	Hose displayers
Counter top equipment	Belt racks
Tee stands	Hat stands
Display stands	Shoe stands
Garment racks	Mannequin
Window stands	Head form



Courtesy of Kaufmann's Department Store, Pittsburgh

A Better Conference in an Air-Conditioned Training Room.

Tools

Hammer	Staple machine
Screw driver	Scissors
Pliers	Glass cutter
Small saw	

Supplies

Nails	Glass
Screws	Wood molding
Tacks	Marking crayon
Crepe paper	Scotch tape

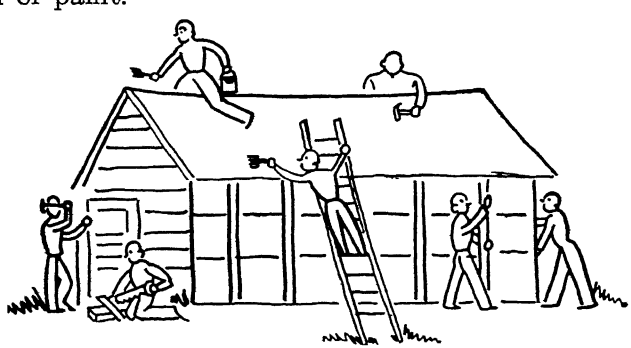
The above list is basic. Each laboratory will require different installations. In addition to blackboard, bulletin board, and facilities for using other visual aids, the training room should also have the following specifications:

Suitable location
Proper heating
Sufficient lighting
Adequate ventilation
16 sq. ft. room space per trainee
6 sq. ft. work space at table

Sources of Laboratory Equipment

The equipment for the laboratory may be (1) prepared by the instructor and trainee, (2) contributed by local agencies, or (3) purchased.

Instructor-trainee-made equipment. In many cases, the initial high cost of new equipment will prevent its outright purchase. However, many training laboratories can be set up for the price of a can of paint.

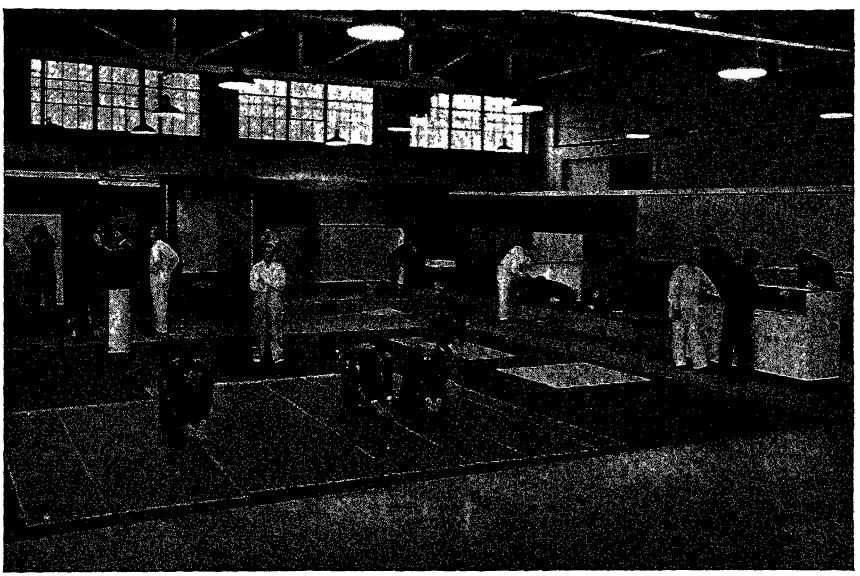


All trainees should be permitted to participate in the planning, construction, finishing, and setting up of equipment for their respective kinds of training. The instructors and trainees in the

practical arts and manual training departments of schools are very helpful in constructing the necessary equipment—likewise, the co-operation of job trainees should be sought and encouraged.

Equipment from local agencies. The majority of local agencies are extremely co-operative and are willing to contribute equipment for a training laboratory. In some cases, the equipment and supplies will require slight repairs. However, selected equipment can be easily adapted for the laboratory in practically any area of training.

Purchase equipment. Experienced architects and contractors can design and build the ideal training laboratory. Equip-



Courtesy of Congoleum-Nairn, Inc.

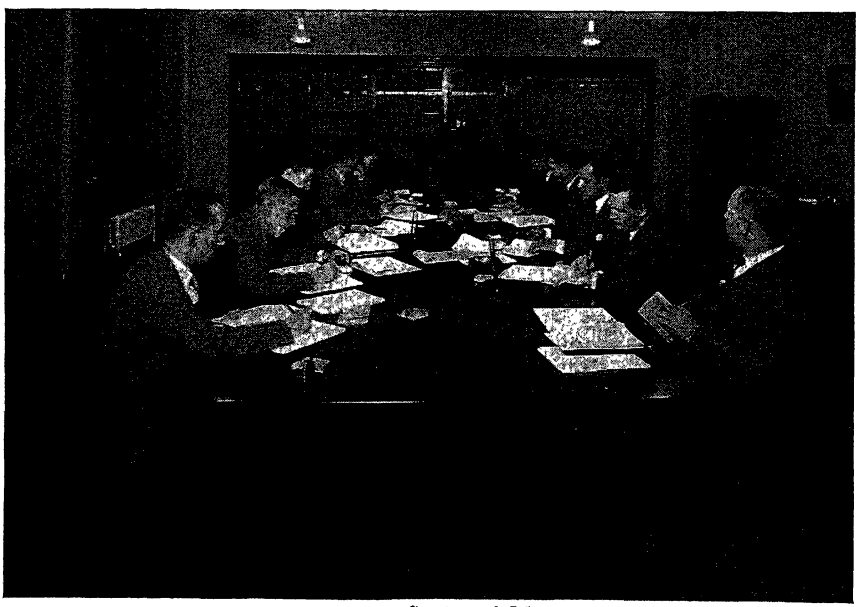
A Good Training Laboratory Should Provide Ample Working Space.

ment companies can offer suggestions of value. The advisory committees of local industrialists and merchants can often suggest the best sources for this equipment.

How to Prepare Training Laboratory Equipment

The specific units required for each laboratory will depend upon the actual training needs and the physical characteristics of the room or training space. The placement and layout of equipment and accessories will largely be determined by wall space, position of windows and doors, and the physical dimensions of the room.

Canvass the merchants, industrialists, and other sources in your community to discover what they have that may be used in your laboratory. Discarded fixtures, files, counters, machinery, and other equipment may be cleaned, oiled, sandpapered, and painted. Permit the trainees to do this job in the shop or training room. Other necessary units should be built from scratch.



Courtesy of John Hancock Mutual Life Insurance Co.

EXECUTIVE TRAINING IN AN APPROPRIATELY EQUIPPED CONFERENCE ROOM.

For example, the following simple directions can be used in constructing a variety store counter from an ordinary table:

1. Secure a discarded long table.
2. Reinforce legs and other joints.
3. Cover front and both sides with wide corrugated paper. (Use stapling machine to attach paper.)
4. Cover table top with oilcloth or counter paper.
5. Secure glass, corners, splicers, screws, price signs, and merchandise from the local variety stores. (Use glass cutter for cutting glass to proper size.)

Store window. Again drawing examples from the area of retailing, it is easy to see how a show window may be constructed at little cost. This display need not be an elaborate affair. It may

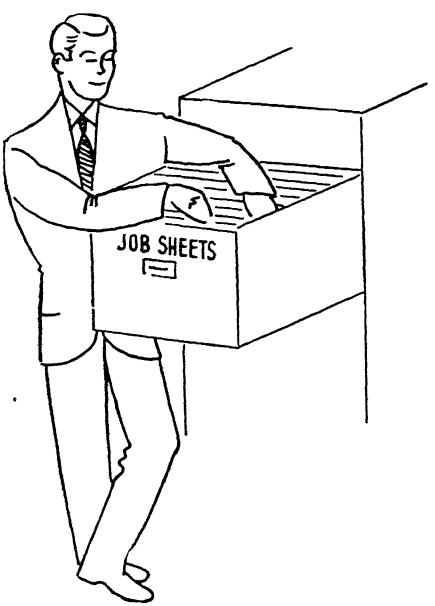
consist of a simple platform and a background made of masonite or wallboard. The glass may be omitted to permit ease in training. However, if this is done, training should also be given in a glass-covered window to develop a complete technique.

Masonite and wallboard instead of lumber may be used successfully in preparing counters, display racks, bins, and other training objects in the laboratory. This type of material is easier to handle and is less expensive than lumber. A wooden frame will increase the sturdiness of the unit. In fact, heavy corrugated paper or large sheets of cardboard may be used satisfactorily with a strong wooden frame.

How to Use the Laboratory

The best-equipped training laboratory is worthless unless it is properly utilized. Projects should be developed to provide an opportunity for the trainee to practice and acquire skill in his specific training jobs.

Before the trainee "tries his hand," the instructor should carefully explain or demonstrate the job. After thorough clarification, the trainee should apply the knowledge and perform the task. The instructor should then constructively criticize the trainee's efforts and permit him to make the necessary changes to improve his project. A group discussion may be used to point out the trainee's weakness and to offer helpful suggestions.

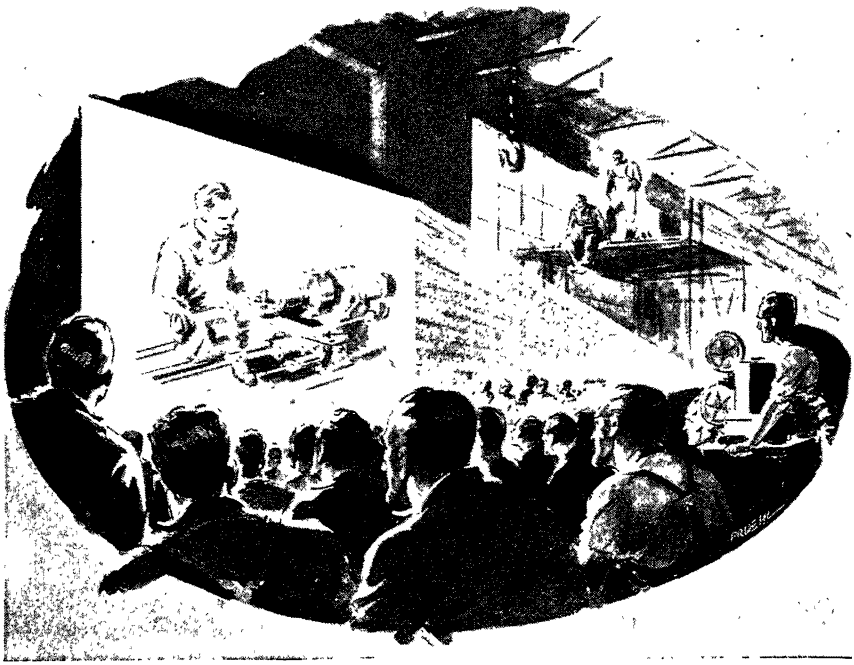




A job work sheet should be prepared for each unit, and the trainee should be required to develop a satisfactory skill before

completing it. The type of project used in the training laboratory will depend upon the specific needs of the trainees and the need for the training.

The job work sheet. The job work sheet should set up the project to meet the specific needs of the trainee. The following



Courtesy of South Bend Lathe Works

simple job work sheets are examples of some that have been satisfactorily used in retail-store training projects:

Window display job sheet

1. Sketch layout plan
2. Clean window
3. Assemble and clean fixtures
4. Assemble display material
5. Assemble merchandise
6. Install display
7. Judge display
8. Return merchandise, fixtures, and display material

Food department job sheet

1. Remove all merchandise and price tags from shelf
2. Clean shelving
3. Dust merchandise

4. Set up merchandise
5. Insert price tags
6. Display "daily special" on counter
7. Prepare sign for daily special
8. Take complete inventory

Showcase job sheet

1. Sketch layout plan
2. Clean showcase
3. Assemble and clean fixtures
4. Prepare display equipment
5. Assemble merchandise
6. Insert material
7. Judge showcase
8. Remove merchandise, fixtures, and display equipment.

Variety store counter job sheet

1. Break down complete counter
2. Wash all glass
3. Clean all fixtures
4. Clean counter top
5. Dust merchandise
6. Set up new ends and center display
7. Lay out remainder of counter
8. Take complete inventory
9. Discuss layout

The instruction sheet. The instruction sheet, when properly prepared, is an invaluable teaching aid because it makes it possible for the trainee to work according to his own ability, and it enables the instructor to give individual attention to each student.

To be effective, the instruction sheet must:

1. Be written in simple English.
2. Be well illustrated.
3. Observe good teaching techniques such as:
 (*a*) preparation.
 (*b*) presentation.
 (c) application.
 (*d*) testing.
4. Have a pleasing and effective lay-out.
5. Avoid crowding.
6. Be reproduced so that it is clear and legible.

How to Prepare an Operational Sheet

In every trade there are certain operations which are used in performing many jobs, such as, centering stock for a lathe, making

a French seam, setting a composing stick to measure, tinning a soldering iron, and inking a drawing pen.

An operation sheet gives in sequential order the steps required to perform an often recurring fundamental step in procedure. The

MIDDLESEX COUNTY VOCATIONAL SCHOOLS
Easton Avenue, New Brunswick, N.J.

Drill Grinding

Machine Shop Unit I — Operation Sheet No.17

Objective:
To grind or sharpen a drill for general purposes.

Preparatory Information:
For general purposes a drill is sharpened to an angle of 59° with a lip clearance of from 12° to 15°. (See figures I and II) If the drill is ground on a dry wheel, care should be taken to prevent the drill from getting hot. The drill should be dipped frequently in water. A high speed drill should be ground on a dry wheel and should not be dipped in water as such sudden cooling might crack the point.

Tools:
Emery wheel, drill gauge, drill to be sharpened.

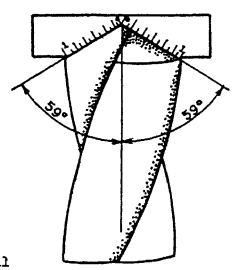


Figure I

Procedure:
(1) Put on your goggles.
(2) Hold drill in right hand about 3/4" from the point with the index finger and thumb, resting the hand on the steady rest.
(3) Grasp drill shank with left hand.
(4) Let point of drill come in contact with the face of the wheel in such a manner that the cutting edge is at right angles with the emery wheel.
(5) Press the drill against the wheel, lowering and raising the left hand and rolling the drill with the right index finger and thumb.
(6) Test the drill with the drill guage. (See Figure I)
(7) Repeat operations 4 and 5 until the required clearance angle and lip are obtained.
(8) Report to instructor to have your work checked.

Questions:
(1) Why should the point of the drill be kept cool while grinding it?
(2) Why should the drill be ground on a fine emery stone having a true surface?
(3) What safety precautions should be observed when grinding a drill?

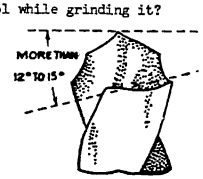


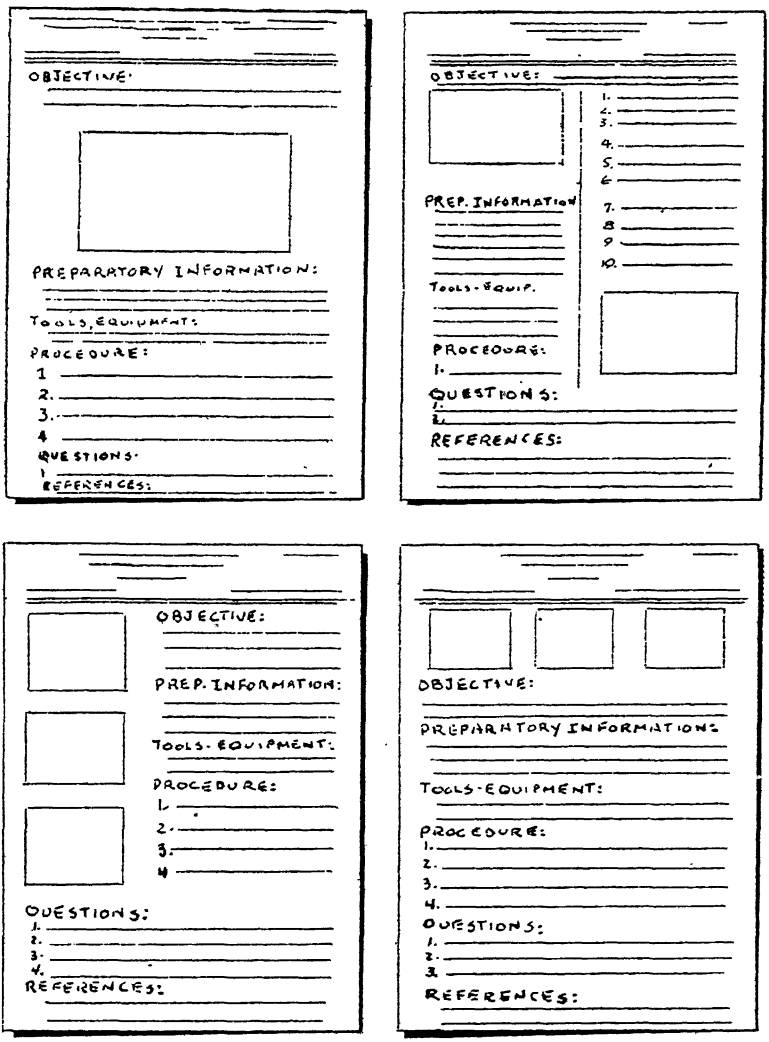
Figure II

References:
Handbook for Drillers, Cleveland Twist Drill Co., Cleveland, Ohio.- Pages 9-20, thirteenth edition, or Pages - 9-20, eleventh edition.
Shop Theory, Henry Ford Trade School, McGraw-Hill Book Co., Inc. - Pages 71-75, Revised Edition.

operation sheet saves time and is efficient because it enables the instructor to write out, once, often recurring operations for use on any job rather than to write them for each specific job. It will be necessary only to refer to the file for the sheet needed.

The operation sheet should contain the following data:

1. Title.
2. Objective.
3. Preparatory information in brief form. Tell why this should be learned.



4. Tools, equipment, materials.
5. Step-by-step procedure illustrated whenever possible. The procedure should tell how to do and should not be encumbered by statements of fact or theory not necessary for the successful

performance of the operation. Correct, up-to-date trade terms should be used.

6. Carefully worded thought-provoking questions.
7. Safety precautions.
8. References.

The instruction sheets illustrated on pages 162 and 163, which show various methods for laying out an operation sheet, have been prepared by Albert E. Jochen, Director of the Middlesex County Vocational Schools, New Jersey.

The industrial and business world is dynamic. The instructor who expects to do effective training must always be alert to new industrial techniques. Courses of study and instructional material must be reorganized and brought up to date periodically to meet industrial changes. To accomplish such objectives and to develop effective instructional materials, the trainer must:

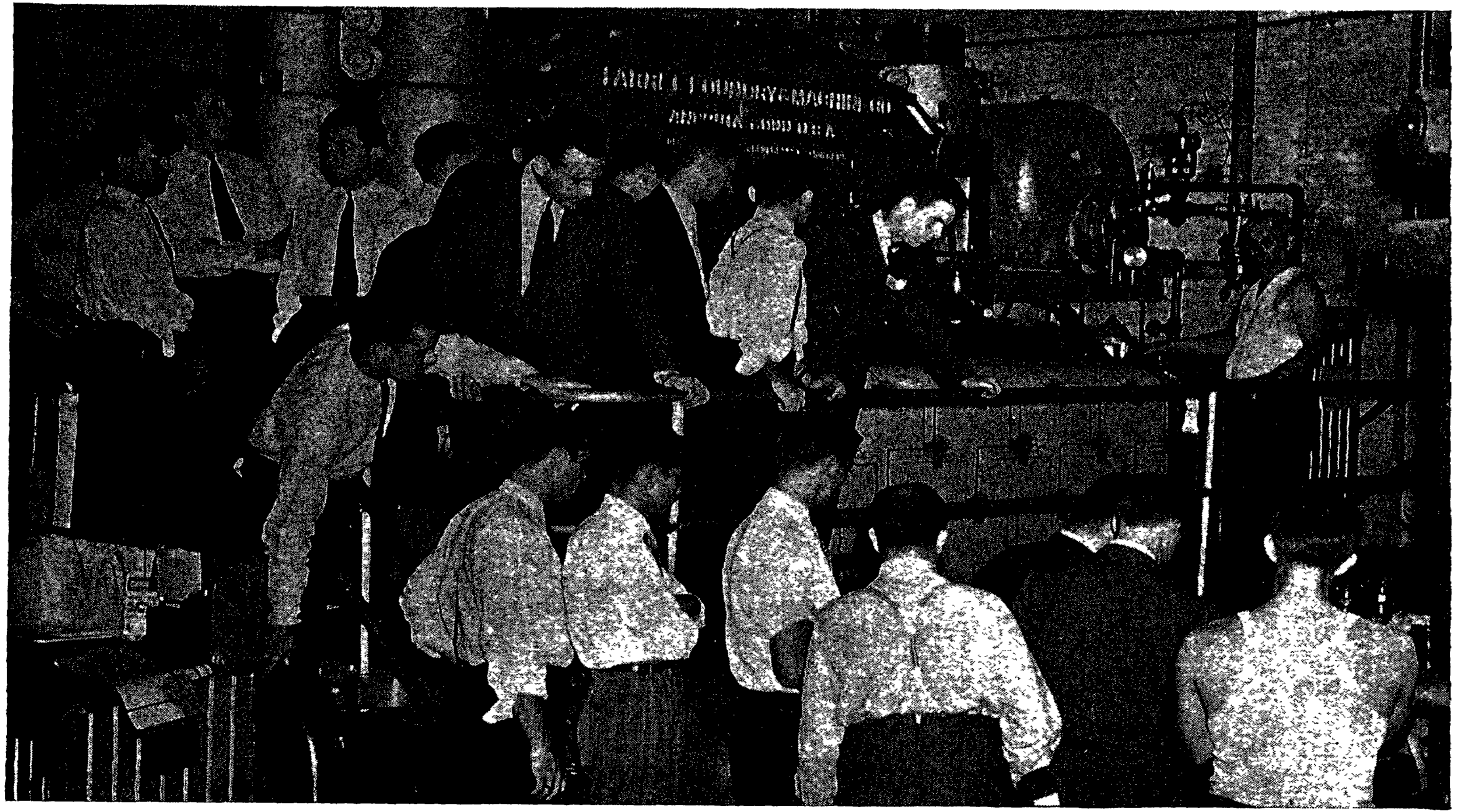
1. Draw upon his or her own experience and training.
2. Read trade journals regularly.
3. Visit industry periodically to observe trade practices.
4. Visit other school shops and classrooms from time to time to get new ideas.
5. Attend conventions, exhibits, and sectional meetings to learn about new trade texts, processes, tools, equipment, machines, instructional material, and educational and industrial trends.

To keep in step with a fast-moving world, planned training is essential. Planned training depends largely for its success on the efficient trainee use of training equipment in a carefully planned training laboratory.

DO's for the Use of the Training Laboratory

DO develop trainee "know-how" with actual equipment, fixtures, and supplies in a job atmosphere.
DO convert out-moded training rooms into dynamic laboratories for learning.
DO secure all equipment, fixtures, tools, and supplies necessary in a training laboratory.
DO provide sufficient space for blackboards and bulletin boards.
DO provide facilities for the use of other training aids.
DO select a suitable location in the building.
DO provide proper heating facilities.
DO provide proper lighting.
DO provide adequate ventilation facilities.

DO allow 16 sq. ft. room space per trainee.
DO allow 6 sq. ft. table space per trainee.
DO lay out the training room to its best advantage.
DO secure co-operation of all local agencies in setting up the training room.
DO canvass local area for all available training equipment.
DO encourage instructor-trainee-made equipment.
DO develop "job work sheets" for each job problem.
DO keep training room up to date.



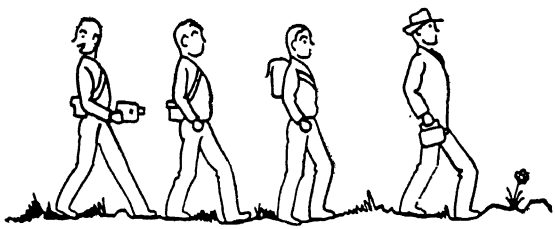
Courtesy of Armstrong Cork Co.

AN IN-SERVICE-TRAINING PLANT TRIP.



Field Trips

FEW TRAINING PROGRAMS are complete without a field trip. Not only does a trip make possible close observation of a multitude of natural and man-made things, but it also offers an opportunity for planned inspection of administration, organiza-



tion, and procedure in many fields. A trip provides the trainee with first-hand information and real experience in a real life situation.

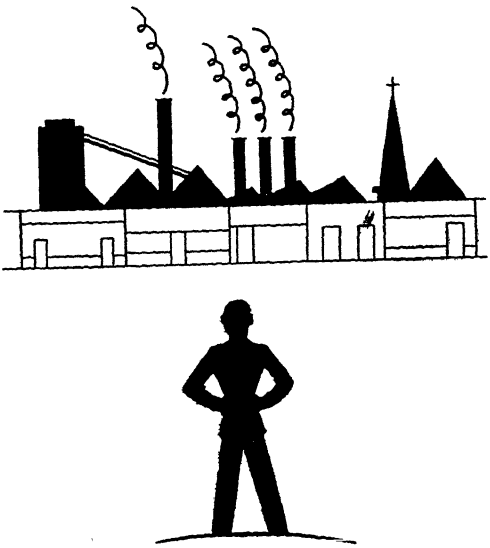
Trainees are greatly impressed by the hustle and bustle in a receiving room, the paints and posters in the copy room, and the orderly confusion of a Saturday afternoon in a busy retail store. The trainee remembers the damp, clean smell of a dairy, the breath-taking heat of a glass furnace, the metallic hum of a weaving room, the thick chill of a walk-in refrigerator in a meat-packing house, or the sharp, pungent odor of a tanning room.

Trip Opportunities

A simple community survey will reveal the businesses which do an outstanding job in some specific phase of distribution, proc-

essing, or manufacturing. In most cases, the managers or owners of these businesses will grant permission for a field trip into their establishments.

No training possibility in the local area should be overlooked. For example, trainees might visit a cotton-goods manufacturer or a hosiery mill to clarify their understanding of weaves or hosiery knitting. To understand food processing, go right to the packing plant, observe the picking of vegetables in the field, the preparation, the freezing or canning, storing, and the final distribution. Supplement the trainee's knowledge on the fish and oyster industry by going to the docks and watching the fish being unloaded from the boats, separated, boxed, iced, and shipped. See the oyster boats come in from their beds, the huge piles in the shucking houses. Watch the lightning speed with which the oysters are opened, sorted, canned, and shipped. For a study of the channels of distribution, watch the produce come into a large city market in boats, trucks, and carloads. Notice how the produce is distributed to the commission merchants; listen to the early morning auctions; see the packages bought, tagged, and loaded on the wagons and trucks for final distribution to retail stores. Visit the showrooms for dress goods and men's wear, the office of the resident buyer, and the central suites of the large buying syndicates. Every type of community has something worth while to offer to a training program.



In-service field trips. Business organizations which conduct in-service training, on their own premises, for both new and experienced employees, should give the trainee an opportunity to observe and "try-his-hand" at the task in the actual job setting. It might be a job in the basement or in a department on the same floor, yet this realistic experience adds something that cannot be duplicated in the training room. In the hands of a capable in-

structor, the participation in life situations becomes a potent technique, especially when it is carefully correlated with the specific topic in the training program. The field trip has an added advantage when used in "on-the-job training" because the trainee can be brought back to the training room immediately for further discussion, testing, or review. Discrepancies and new items that were noted on the trip may also be discussed and clarified at that time.

How to Conduct a Field Trip

In order to avoid a "what-are-these-dopes-doing" attitude, it is necessary to plan carefully each step of a field trip. The success or failure of a trip is in direct ratio to the amount and caliber of this groundwork. Each trip will present its individual problems. However, the following suggestions are basic and are applicable in the majority of training situations:

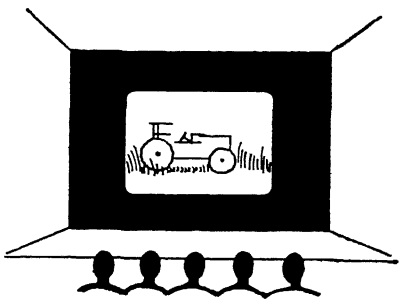
1. Determine the specific aims of the trip.
2. Select the training agency which will best serve the purpose.
3. Receive permission from the proper authorities to make the trip, and check all institutional regulations.
4. Make definite arrangements with the manager or executive as to (1) date, (2) time, (3) number of trainees, (4) number of company guides, and (5) the objectives of the trip.
5. Prepare guide sheets for each trainee.
6. The instructor should visit the training agency and become familiar with the itinerary before taking the actual trip.
7. Check on location of rest rooms and eating facilities.
8. Check transportation facilities.
9. Provide transportation for the trainee, or give specific directions about where to meet.
10. Limit groups to a maximum of ten trainees. It is difficult for one guide to handle a larger number.
11. Make sure each trainee knows what to observe.
12. Be punctual. Arrive and depart at the set time.

When the training program is conducted on the premises, and a trip is taken to a department in the same plant, some of the above steps may be omitted. However, in most situations, these steps are essential and they must be carefully planned to assure a successful field trip.

is such a popular and potent visual aid that it is comparatively easy to arouse the trainee's interest in it. However, it is important that the instructor point out what specific things the trainee should observe during the trip. The trainee should also be informed how a knowledge of these facts will help him.

Other allied visual aids, such as flat pictures, maps, charts, posters, slides, motion pictures, stripfilm, and slidefilm should also be used to put the trainee in the proper frame of mind.

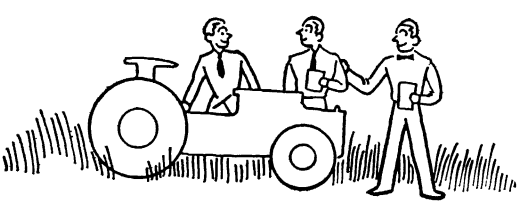
If the trainee realizes that his ability will be tested at the completion of the field trip, it will act as an added incentive to pay close attention to all details.



Specific information regarding time and location of the field trip should be given to the trainee before he leaves the training room.

2. *Conduct field trip.* To avoid exposing the trainee to a tumult of confusing sensations, carefully follow the plan suggested in the previous unit on "How to Conduct a Field Trip."

Do not underestimate the value of a guide sheet: it is a necessary device in a successful field trip. The trainee should fill in the important points on the guide sheet as the trip progresses or as soon afterward as possible. To make certain that the executive, manager, or guide covers each point, provide him with a copy of the guide sheet, and check through it together several days prior to the trip.





If the business regulations permit, prepare flat photographs, slides, or motion pictures depicting the important points covered in the trip. Motion pictures and slides will require a period of time for development, but flat pictures may be used in the immediate follow-up, provided the instructor has developed a dark-room technique or availed himself of a rapid-film-developing service in the

community. The finished motion pictures or slides may be adequately used in a review at a later date.

Carefully catalogue and file all field-trip material for future reference and evaluation.

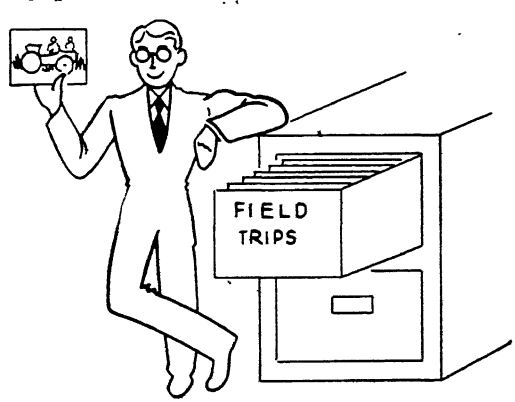
3. *Follow-up field trip.* Each field trip should be followed up as soon as possible by trainee application, discussion, and further training if the trip was the type that gave the trainee an opportunity to "try-his-hand" on the job.

If the purpose of the trip was to observe a skill, the trainee should be asked to perform the job in the training room. A trip that was conducted for obtaining factual information should be followed up by a group discussion to clarify any weak points or misconceptions.

Each step of the manipulative skill or factual information should be carefully checked. Utilize the trainee guide sheet to accelerate this procedure. Because the guide sheet serves to refresh the trainee's mind and forms the basis of the training-room discussion, its use is essential.

4. *Test trainee.* It is of the utmost importance that the trainee's knowledge and ability be adequately tested. All weaknesses and errors must be corrected immediately.

The specific methods used to test the trainee will depend upon the nature of the job. Generally, a skill may be tested by giving the trainee an opportunity to perform the job. Factual knowledge or attitudes may be tested by pertinent check lists or brief objective tests of the true-false, multiple choice, completion, and matching type.



The trainee should be able to perform the task with the proper timing and speed. He should also be expected to use appropriate technical terms in explaining his job.

5. *Review the training.* All errors which are detected by trainee testing should be corrected immediately. However, by all means avoid criticizing the trainee. Employ a constructive and tactful technique. Much more can be accomplished by

maintaining friendly relations with the trainee than by earning his hostility.

Reshow the flat pictures that were prepared during the trip. If possible, exhibit the slides or motion pictures that were also prepared at that time. In fact, utilize any material on file, in relation to the store trip, that will help review the job problem. The all-important thing is that the trainee should be able to perform the job satisfactorily. *Remember, if the instructor has taught—the trainee can perform.*

DO's for the Use of the Field Trip

DO avoid "spur of the moment" trips.
DO survey all trip possibilities in local area.
DO plan each detail of the trip carefully.
DO use the trip for on-the-job training.
DO prepare store manager-trainee guide sheets for each trip.
DO make certain the trainee knows what to observe.
DO make certain the store manager or guide knows what he is to show the trainee.
DO prepare the trainee before making the trip.
DO be punctual.
DO work in small groups.
DO follow plan as outlined in guide sheet.
DO correlate the trip with the specific training job.
DO prepare flat photographs, slides, or motion pictures of the trip.
DO follow up the trip as soon as possible.
DO test the trainee.
DO use pictures, slides, and motion pictures for review purposes.
DO evaluate and check results of each trip.
DO catalogue and file all trip material for future reference.



Courtesy of Columbia Broadcasting Co.

TELEVISION BROADCAST AND CONTROL BOARD—A VITAL TRAINING TOOL.



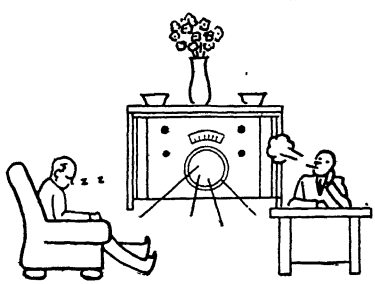
Television

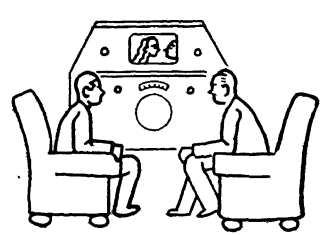
Nature of Television Programs

OBVIOUSLY, television is a more potent advertising medium than the radio broadcast because it presents the actual picture instead of a meager description of it. This ability of television to glamorize the uses or operation of a product will increase customer appeal, and the trainee must also have a complete knowledge of the uses or operations of the product in order to be able to advise a better informed buying public. It would be disastrous to underestimate the importance of television in effective training processes.

Television broadcasts that may be used for employee training will deal chiefly with the (1) exhibition, (2) operation, and (3) use of the actual product. Such are the "living" mail-order catalogue, which displays the various products being offered, and the short-skit type of broadcast, which actually demonstrates the object in use.

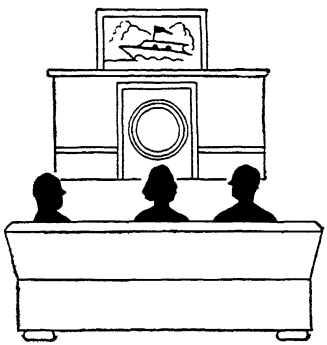
Although the majority of televized broadcasts are of the recreational or amusement type, a large number of the morning and





afternoon programs are especially adaptable for use in industrial and store training. Religious ceremonies, sports events, agricultural projects, school pageants, and many other outdoor events may also be readily used to illustrate specific phases of job training.

The opportunities and number of offerings will also increase as the larger distributive and industrial organizations throughout the country add transmitters to their intraorganization television systems. This will enable them to go into full-scale television, and instead of confining their show-screens to a store window and a few other advantageous spots throughout the plant, they will be able to reach out into the homes of the surrounding area. Intraorganization television units are being installed for approximately $25,000, depending upon the number of telesets. Business and manufacturing concerns may easily expand such facilities by adding new units which may be purchased as low as $500. Eventually, a transmitting unit, which would reach homes within a radius of seventy-five miles, may also be attached to the intraorganization system at a similar proportionately small cost. The additional business that this would bring to a distributive or industrial concern would more than pay for the television system.

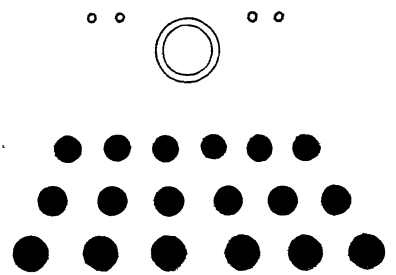


At the present time, television broadcasts are either of a permanent nature, such as those that utilize motion picture film, or the temporary type which show displays in different sections of a store, sporting events, or on-the-spot news highlights. Eventually, even the temporary-type broadcast will be made permanent on a roll of film or a spool of recording wire. However, until the time comes when the individual receiving set can handle this operation, it will be necessary to confine the use of this training aid to (1) arousing trainee interest and (2) presenting less complicated manipulative skills and brief informational job problems.

How to Prepare to Use a Television Program

Check all physical factors. The type of teleset, size of screen, and the size and shape of the training room will determine the

number of trainees that can adequately be handled at one time. Television screens which are the "built-in-the-wall" type have been set up by experienced engineers in the most advantageous spot in the room. However, at the present time, the majority of telesets are of the portable "radio-cabinet" type, and it will depend upon the common sense of the instructor to make sure that the teleset is placed so that the screen is clearly visible to each trainee. Most satisfactory results can be obtained by confining the training program to the smallest possible group of trainees. As the size of the television screen is enlarged, a larger number of trainees will be able to observe the program at one time.



Avoid last-minute fumbling and distractions by checking (1) lighting, (2) ventilation, (3) seating, and (4) the teleset before the group convenes.

Lighting. Total darkness is not necessary because of the screen's construction. However, shading the room will usually in-



Courtesy of Allen Dumont Labs., Inc.

TELEVISION AS A MEDIUM FOR RELIGIOUS TRAINING.

crease the intensity of the image. In most training rooms, it will only be necessary to lower the shade in the front of the room or in the area affecting the screen. Experiment with the lighting until you find the best arrangement for the specific training room. A correctly prepared room will shade the screen area and yet provide enough light to permit the trainee to take brief notes on the broadcast program. By all means prevent the outside rays of light from falling on the screen or shining in the face of the trainee.

Check the room light switch to make certain the power for the teleset is not controlled by the same switch.

Ventilation. The importance of proper ventilation cannot be overemphasized. Regardless of how interesting a program may be, a hot, stuffy room induces drowsiness and causes the trainee to lose interest.

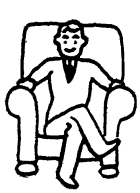
Occasionally, cross ventilation between the window and a door at the rear of the room will help alleviate this condition. Of course, best results are obtained if the training room is air-conditioned. However, until this is possible, an ordinary electric fan or a portable air-conditioning unit will help solve the ventilation problem.

Remember, when the temperature rises above 72 degrees and the humidity above 50 degrees, training becomes a difficult process for both the instructor and trainee.

Seating. The exact seating arrangement will depend upon the size and shape of the room. Generally, the following rule should be observed. For better vision, confine seating arrangement to a space formed by a 45-degree angle. Leave approximately six feet between the screen and the first row of trainees. In most cases the image on a screen will become distorted when viewed from outside this space.

Do not overlook the effect of a comfortable chair. It can change a disagreeable meeting place into a haven of delight for the trainee.





The teleset. Select the proper station and make all necessary adjustments before the group meets. Switch off the teleset after the station is properly "tuned-in." When the program begins, it should only be necessary to switch on the teleset. Allow approximately thirty seconds for the tubes to warm up. Accurate timing is essential:

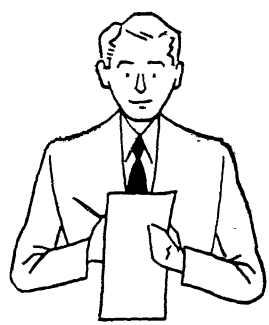
this is good showmanship and tends to give the training program a more professional air.

How to Use Television in Personnel Training

In order to utilize a television program effectively, the instructor should (1) obtain a copy of the script or discuss the program with its sponsor before the broadcast and (2) secure all related printed materials, such as manuals and leaflets, pertaining to the topic of the broadcast.

In some cases, program sponsors might be reluctant to distribute scripts of their programs prior to their broadcast. However, a discussion with the sponsor, either personal or by mail, would reveal the nature of the contents and provide the instructor with a working outline. This advance knowledge is of the utmost importance.

Eventually more related printed material will be made available as more sponsors tie up their advertising campaigns with their television broadcasts. This material will not only guide the instructor in the preparation and the presenting of the job problem, but will also be of help to the trainee in the follow-up activities after the broadcast.

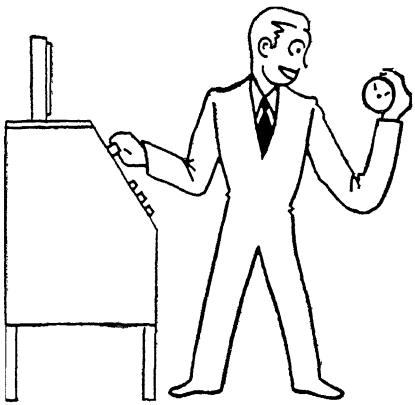


Variations in the different types of broadcasts will not alter the fact that the most satisfactory results may be obtained by observing the following steps:

1. *Prepare the trainee.* Proper trainee preparation becomes even more important when it is to be followed by a television program. The enthusiasm and interest of the trainee should be so thoroughly aroused that the trainee will get as much as possible out of the broadcast. One of the most effective ways of doing this is simply to point out to the trainee how he can personally benefit by a complete understanding of the job problem. Second, the instructor should guide the trainee's thinking by telling him exactly what important points to observe and remember.

2. *Present the television program.* Proper timing is essential in the use of this most modern training aid. If notes or sketches are to be made during the broadcast, the instructor should make certain that each trainee is supplied with pencil and paper before

the program starts, and as the broadcast develops the trainee should note the important points or steps that were discussed by the instructor during the training preparation. The trainee should confine his note-taking to brief outlines to avoid missing other important parts of the broadcast. At the end of the program, the instructor should allow the trainee time to complete his notes or sketches. This should be done immediately after the broadcast while the material is still fresh in the mind of the trainee.



3. *Discuss or apply the job problem.* After the trainee's notes or sketches have been prepared, the job problem should be discussed or applied as soon as possible.

Factual information, attitudes, and morale types of job problems may usually be best handled by informal conference discussion. Each trainee should be given an opportunity to clear up any misunderstanding which he might have at that time. The instructor, who will act as the conference leader, should guide the discussion and summarize each point as it is clarified by the group of trainees. A check list of the important points or steps will also be very helpful in guiding the instructor. The skilled conference leader should observe all the good practices of conference-leading to make this discussion a vital feature of the job problem.

Job problems which deal with manipulative skills may be most effectively handled by permitting the trainee to perform and demonstrate the operation. Each trainee should be given an opportunity to perform the job until he obtains a complete knowledge of it. Asking the trainee to perform the job and explain each step to the group will enable the instructor to check on his manipulative speed and the use of proper technical terms.

Manuals, booklets, leaflets, and other program sponsor's literature that satisfactorily cover the important points of the broadcast will make it unnecessary to take notes, and will permit the trainee to devote his complete attention to the program. However, if the available sponsor material is incomplete or impractical, it will be necessary for the trainee to use his own notes or sketches as a guide

in the job problem discussion or application. Carefully planned and illustrated literature can clear up discrepancies and greatly facilitate the follow-up activities.

The trainee outline and the literature prepared by the broadcast sponsors will serve as excellent sources of reference, and should be filed for future use.



Courtesy of General Electric Co.

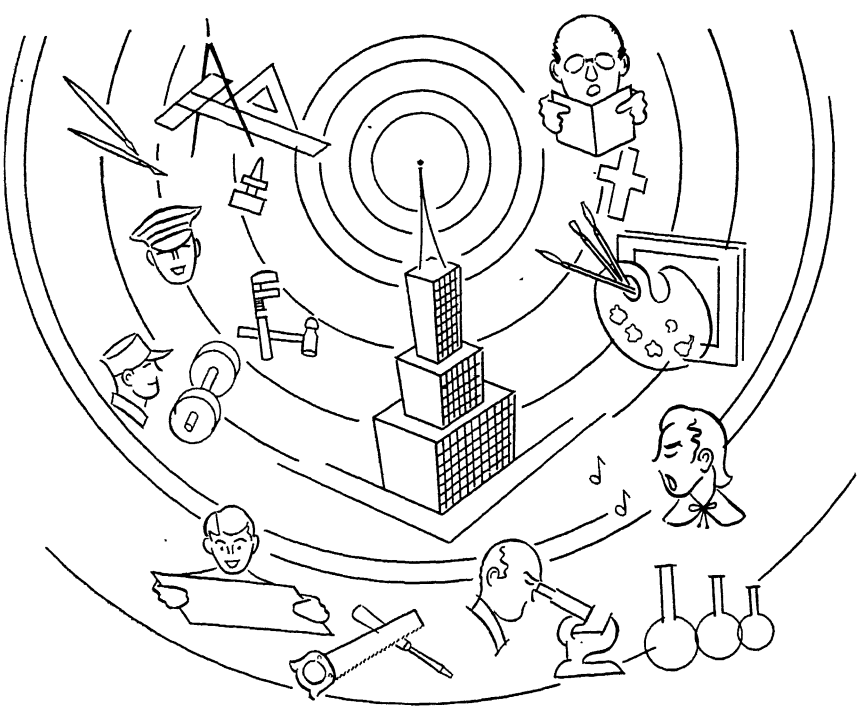
TELEVISION AS A MEDIUM FOR PRODUCT EXHIBITION AND SALES PROMOTION.

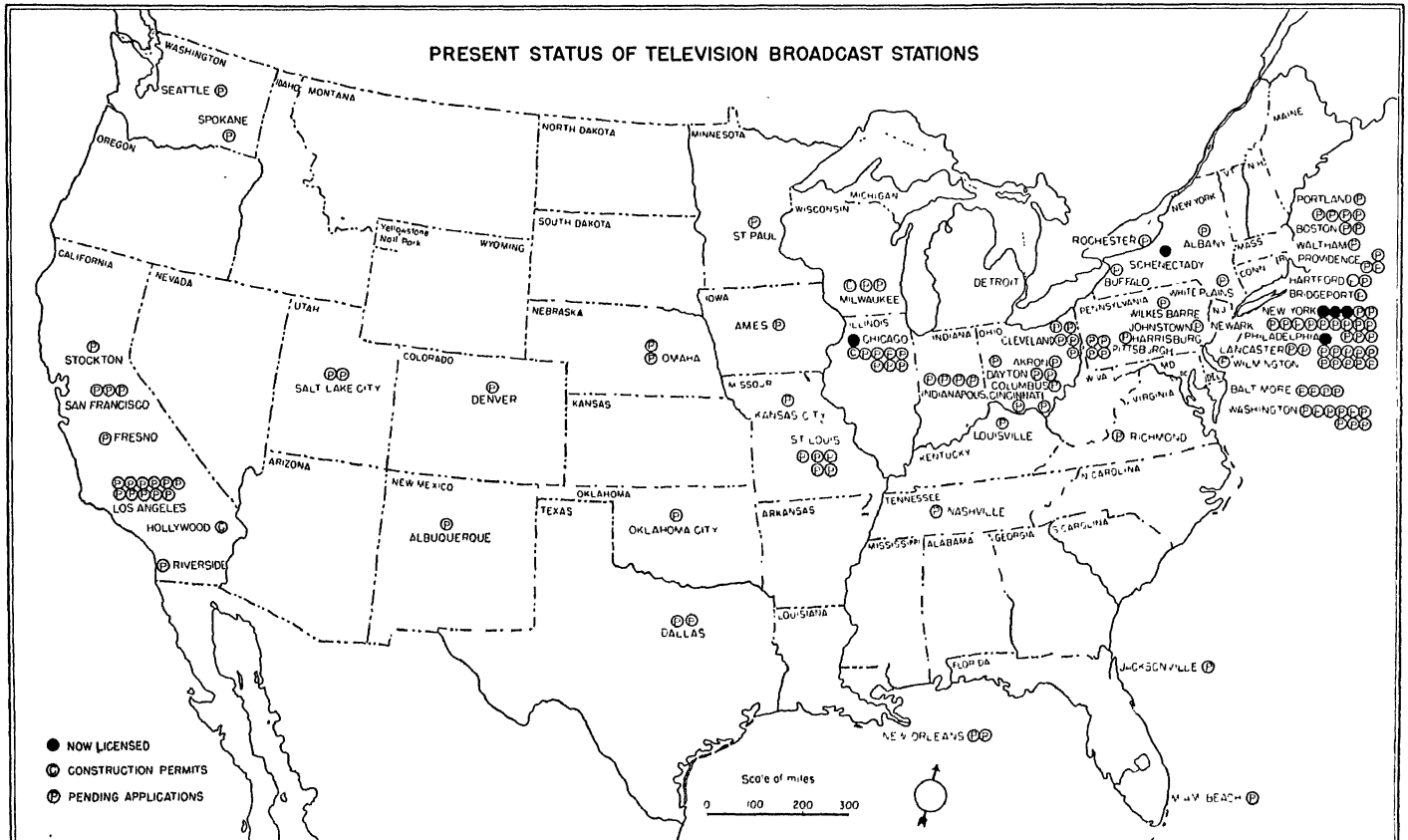
4. *Test the trainee.* The trainee understanding of the job problem should be checked—not chiefly to determine a grade or mark, but to discover trainee's weaknesses and errors. The test may be oral or written. However, lengthy subjective examinations should be avoided. The most effective results can be obtained with a brief objective test or check list. Pertinent "true-false," multiple choice, completion, and matching-type questions are most satisfactory. Check lists or tests, such as the response cards used in the United States Navy training program, which have been constructed so that it is only necessary for the trainee to punch a hole or place a check mark, have been very successful. The most important factor is that the test be constructed so that it will

indicate what the trainee knows or does not know about the specific job problem in a simple and brief fashion.

5. *Review the job problem.* All trainee weaknesses or errors which have been disclosed by the test should be corrected immediately. If necessary, each trainee should receive individual instruction. The trainee must have the proper knowledge and be able to perform the job correctly.

An ideal review of the job problem would be to reshow the television program. However, until this becomes a simple operation, the instructor may use the trainee outlines, sponsor's literature, flash cards, posters, charts, graphs, diagrams, pictures, models, specimens, objects, motion pictures, slidefilm, slides, or any other pertinent training aids which are related to the specific job problem. The exact types of training aid or combination of training aids to use will be determined by the particular job problem. The aim of the instructor is not to expose the trainee to a multitude of sensations, but to use every possible aid at his command to make certain that the trainee understands and can perform the job. Remember, *if the trainee cannot perform, the instructor has not taught.*




PRESENT STATUS OF TELEVISION BROADCAST STATIONS
WASHINGTON
SEATTLE
SPOKANE
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
Yellowstone Nat'l Park
UTAH
COLORADO
NEW MEXICO
ARIZONA
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
S. CAROLINA
N. CAROLINA
VIRGINIA
W. VA.
PENNSYLVANIA
NEW YORK
MAINE
VT.
N.H.
MASS.
CONN.
R.I.
N.J.
MD.
DEL.
ST PAUL
AMES
OMAHA
CHICAGO
MILWAUKEE
DETROIT
ROCHESTER
ALBANY
SCHENECTADY
BUFFALO
WHITE PLAINS
WILKES BARRE
JOHNSTOWN
HARRISBURG
PITTSBURGH
CLEVELAND
AKRON
DAYTON
COLUMBUS
CINCINNATI
INDIANAPOLIS
LOUISVILLE
NEWARK
PHILADELPHIA
LANCASTER
WILMINGTON
PORTLAND
BOSTON
WALTHAM
PROVIDENCE
HARTFORD
BRIDGEPORT
NEW YORK
BALTIMORE
WASHINGTON
RICHMOND
NASHVILLE
KANSAS CITY
ST LOUIS
SALT LAKE CITY
DENVER
ALBUQUERQUE
OKLAHOMA CITY
DALLAS
STOCKTON
SAN FRANCISCO
FRESNO
LOS ANGELES
HOLLYWOOD
RIVERSIDE
JACKSONVILLE
NEW ORLEANS
MIAMI BEACH
NOW LICENSED
CONSTRUCTION PERMITS
PENDING APPLICATIONS
Scale of miles
0 100 200 300

Television Marches On

Television can be used for dynamic training as well as for dynamic selling. As the number of teleset users increase, with a continual decrease in the cost of the unit, new ideas and improvement in broadcasting technique will raise television to its pinnacle of importance in the field of personnel training.

England is equipping 20,000 training rooms with television units. What is being done to harness this high-powered training aid in your training program?

DO's for the Use of Television

DO determine all television programs in area which may be used in training programs.
DO check nature of program before using it.
DO collect all related training material before the broadcast.
DO select the best lighting arrangement for specific training room.
DO provide proper ventilation.
DO check seating arrangement before group meets.
DO tune in the proper station on the teleset before the meeting.
DO check watch for perfect timing.
DO prepare the trainee for the broadcast.
DO make sure each trainee can see the screen.
DO discuss or apply the job problem as soon as possible after the broadcast.
DO use trainee outlines or program sponsor's literature in the follow-up activities.
DO test the trainee's knowledge of the job problem.
DO use brief, pertinent objective tests.
DO review the job problem.
DO utilize all other related training aids.
DO file all sponsor's material relating to the broadcast for future reference.
DO remember *if the trainee cannot perform, the instructor has not taught.*

APPENDIX 

Printed Training Aids

THE INSTRUCTOR or personnel trainer should regard visual aids as adjuncts to good training. Such aids cannot displace good textbooks and instructional techniques that have been used for generations. Visual aids are primarily intended for group study, and the content of even a series of motion pictures may not equal the content value of a good textbook. Further, students can study a textbook at their own pace; they are not retarded or speeded by the fixed pace of the motion picture or sound film.

In addition to good textbooks, the need for special printed or duplicated training aids may arise. Because such aids are intended to relate to a specific situation or object, they are prepared by the instructor for spot use. These may be duplicated bulletins, single sheets of information or directions, cartoons, or illustrative material for bulletin boards. They should be prepared with the following considerations in mind:

1. They should be concise, simple and clear.
2. They should be prepared to appeal to the readers; to encourage them to read and study the materials. Printed materials should not be dry statements of facts.
3. They should be of a size convenient for use.
4. They should be illustrated as fully as the need requires.

When a large number of printed training aids are required, the services of a commercial printer should be secured. However, effective duplicates of printed training aids for use in the training department or interorganization communications may be adequately prepared by the use of the Ditto, Mimeograph, Porta-

graph, Dexigraph, Lettergraph, Hektograph, Rex-o-graph, or numerous other duplicating machines.

Sources of Equipment

Ditto: Ditto, Inc., 641 S. Oakley Blvd., Chicago, Ill.
Mimeograph: A. B. Dick Company, 720 W. Jackson Blvd., Chicago, Ill.
Portagraph—Dexigraph: Remington Rand, Inc., 315 Fourth Avenue, New York, N. Y.
Lettergraph—Hektograph: The Heyer Corporation, 901 West Jackson Blvd., Chicago, Ill.
Rex-o-graph: Rex-o-graph, Inc., 3721 N. Palmer Street, Milwaukee, Wis.

Complete information concerning style, size, price, and operation of the listed duplicators may be obtained by contacting the nearest distributor or by writing directly to the central office.

APPENDIX 

Sources of Visual Aids

VISUAL AIDS are being distributed by manufacturers, producers, processors, distributors, service groups, local schools, colleges and universities, federal government departments and agencies, state government departments and agencies, libraries, churches, museums, associations, and commercial dealers throughout the country.

These aids may be purchased, rented, or borrowed. In a large number of cases, they are made available free of charge with the user paying the cost of transportation. In some cases, distribution is limited to local or state areas. However, the majority of these aids are available on a national basis.

Colleges and Universities

On pages 190 to 196 are listed some of the colleges and universities that have made available a large variety of visual aids to interested groups and instructors.

Colleges Furnishing Visual Aids	*Motion Pictures*	*Discussional Stripfilm and Sound Slidefilm*	*Slides*	*Maps Charts Graphs Diagrams*	*Posters*	*Exhibits*	*Objects Specimens Models*	*Photographs and Pictures*
Alfred Holbrook College, Manchester, Ohio	×							
American College of Surgeons, 40 E. Erie St., Chicago, Ill.	×	×						
Arkansas State Teachers College, Conway, Ark.	×	×	×					
Asheville Normal Teachers College, Asheville, N. C.	×							
Birmingham-Southern College, Birmingham, Ala.	×							×
Bonebrake Theological Seminary, Dayton, Ohio	×							
Boston University, School of Education, Division of Teaching Aids, 84 Exeter St., Boston, Mass.	×	×	×					
Brigham Young University, Bureau of Visual Instruction, Provo, Utah	×	×	×					
Bucknell University, Classroom Film Library, Lewisburg, Pa.	×							
California Polytechnic School, Bureau of Agricultural Education, P.O. Box 321, San Luis Obispo, Calif.	×	×		×				
Central State Teachers College, Extension Department, Mt. Pleasant, Mich.	×	×		×		×		×
Central Washington College of Education, Department of Public Service, Ellensburg, Wash.	×	×						
Chicago College of Osteopathy, 5250 Ellis Ave., Chicago, Ill.	×	×	×			×	×	×
Clarion State Teachers College, Clarion, Pa.	×							
Clemson College, South Carolina Extension Service, Clemson, S. C.	×	×		×	×	×	×	×
College of St. Francis, Department of Education, Joliet, Ill.		×	×	×		×	×	×
Columbia University, Teachers College, Bureau of Publications, 525 W. 120th St., New York, N. Y.	×			×				

Columbia University, The Geographical Press, New York, N. Y.	×							
Danbury State Teachers College, Geology Department, 181 White St., Danbury, Conn.	×	×					×	
Dartmouth College, Audio-Visual Education Department, Hanover, N. H.	×							
Eastern State Normal School, Castine, Maine	×	×	×	×	×	×		×
East Texas State Teachers College, Commerce, Tex.			×	×	×		×	×
Franklin College, Ind.	×							
Harvard Film Service Biological Laboratories, Cambridge, Mass.	×							
Idaho State Normal School, Albion, Idaho	×							
Illiff School of Theology, Denver, Colo.			×					
Illinois State Normal University, Visual Education, Normal, Ill.	×	×	×	×				
Indiana University, Bureau of Visual Instruction, Bloomington, Ind.	×		×		×	×	×	×
Iowa State College, Visual Instruction Service, Ames, Iowa	×	×	×					×
John Brown University, Siloam Springs, Ark.	×						×	×
Kansas City-Western Dental College, Kansas City, Mo.	×							
Lane College, Jackson, Tenn.	×							
Lewis Institute, Department of Psychology, in co-operation with the Psychological Museum, 1951 Madison St., Chicago, Ill.	×					×		
Los Angeles Baptist Theological Seminary Book Store, 2117 E. 6th St., Los Angeles, Calif.		×						
Louisiana Polytechnic Institute, Extension Division, Ruston, La.	×							
Louisiana State University, General Extension Service, University, La.	×	×	×					

Colleges Furnishing Visual Aids	*Motion Pictures*	*Discussional Stripfilm and Sound Slidefilm*	*Slides*	*Maps Charts Graphs Diagrams*	*Posters*	*Exhibits*	*Objects Specimens Models*	*Photographs and Pictures*
State Teachers College, East Stroudsburg, Pa.	×						×	×
State Teachers College, Radford, Va.							×	
Stockton Junior College Film Library, Stockton, Calif.	×	×						
Stout Institute, Menomonie, Wis.	×							
Syracuse University, Co-operative Educational Film Library, Syracuse, N. Y.	×							
Taylor University, Upland, Ind.	×							
Texas State College for Women, Denton, Texas.	×							
Texas Technological College, Department of Visual Instruction, Lubbock, Tex.	×							
University of Arizona, University Extension Division, Tucson, Ariz.	×	×	×					
University of California, Department of Visual Instruction, 301 California Hall, Berkeley, Calif; and 815 S. Hill St., Los Angeles, Calif.	×							×
University of California Medical School, Medical Center, San Francisco, Calif.	×	×	×	×		×	×	×
University of Chicago, Oriental Institute, Chicago, Ill.	×							
University of Chicago Press, 5750 Ellis Ave., Chicago, Ill.	×		×	×				×
University of Colorado, Bureau of Visual Instruction, Boulder, Colo.			×					
University of Connecticut, Extension Specialist in Gardening, Storrs City, Conn.	×	×	×	×			×	×
University of Florida, Department of Visual Instruction, Gainesville, Fla.	×	×	×		×			×

University of Hawaii, Adult Education Division, Honolulu, T.H.	×	×	×					×
University of Idaho, University Film Service, Pocatello, Idaho	×	×						
University of Illinois, Visual Aids Service, 1206 W. Springfield, Urbana, Ill.	×							
University of Iowa, Department of Visual Instruction, Iowa City, Iowa	×		×			×		×
University of Kansas, Bureau of Visual Instruction, Lawrence, Kans.	×		×					
University of Kentucky, Department of Visual Aids, Lexington, Ky.	×		×					
University of Maine, Orono, Maine	×							
University of Michigan, Extension Service, Ann Arbor, Mich.	×		×					
University of Minnesota, Bureau of Visual Instruction, 405 Administration Bldg., Minneapolis, Minn.	×	×	×					
University of Missouri, Visual Education Service, Columbia, Mo.	×	×	×					
University of Nebraska, Lincoln, Nebr.	×		×			×	×	
University of New Hampshire, Educational Film Library, Durham, N. H.	×	×						
University of New Mexico Film Library, Albuquerque, N. Mex.	×							
University of North Carolina, Bureau of Visual Education, Chapel Hill, N. C.	×	×	×	×	×	×		×
University of Oklahoma, Visual Education Department, Norman, Okla.	×	×	×					×
University of San Antonio, San Antonio, Tex.	×							
University of Scranton, the Library, Scranton, Pa.		×						
University of South Carolina, Extension Division, Columbia, S. C.	×		×					

COLLEGES AND VISUAL AIDS	*Motion Pictures*	*Discussional Stripfilm and Sound Slidefilm*	*Slides*	*Maps Charts Graphs Diagrams*	*Posters*	*Exhibits*	*Objects Specimens Models*	*Photographs and Pictures*
University of South Dakota, Extension Division, Vermillion, S. Dak.	X	X	X	X		X		X
University System of Georgia, Division of General Extension, 223 Walton St., N.W., Atlanta, Ga.	X							
University of Tennessee, Division of University Extension, Knoxville, Tenn.	X							
University of Texas, Visual Aid Department, Austin, Tex.	X	X	X	X		X		
University of Texas, Visual Instruction Bureau, Austin, Tex.	X	X	X					X
University of Virginia, Extension Division, Charlottesville, Va.	X					X		
University of Wisconsin, Bureau of Visual Instruction, Madison, Wis.	X							
Vander Cook School of Music, 1655 Washington Blvd., Chicago, Ill.	X							
Virginia State Teachers College, Radford, Va.	X	X		X	X	X		X
Western State Teachers College, Kalamazoo, Mich.			X					
West Texas State Teachers College, Bureau of Public Service, Canyon, Tex.	X							
West Virginia University, Visual Education Service, Morgantown, W. Va.	X							
Wilson Teachers College, Washington, D. C.	X							
Yale University Press, 386 Fourth Ave., New York, N. Y.	X		X					

Federal Government Departments and Agencies

The following is a list of federal government departments and agencies from which visual aids may be obtained:

U. S. Department of Agriculture, Washington, D. C.: Bureau of Agricultural Economics, Division of Economic Information; Bureau of Animal Industry; Bureau of Entomology and Plant Quarantine; Bureau of Home Economics, Division of Extension Information; Farm Credit Administration; Farm Security Administration; Forest Service; Forest Service, Juneau, Alaska; Rural Electrification Administration; Soil Conservation Service; Soil Conservation Service, Regional Office, Spartanburg, S. C.; Weather Bureau.

U. S. Department of Commerce, Washington, D. C.: Weather Bureau; Bureau of Foreign and Domestic Commerce; Civil Aeronautics Authority.

U. S. Department of the Interior, Washington, D. C.: Boulder Dam Service Bureau, Boulder City, Nev.; Bureau of Mines (4800 Forbes St., Pittsburgh, Pa.); Bureau of Reclamation; Division of Information, Photographic Section; Division of Territories and Island Possessions, Philippine Section; Fish and Wildlife Service; Geological Survey; National Park Service.

U. S. Department of Labor, Washington, D. C.

Federal Loan Agency, Washington, D. C.; Federal Housing Administration.

Federal Security Agency, Washington, D. C.: Public Roads Administration; U. S. Housing Authority.

Navy Department, Washington, D. C.: Hydrographic Office.

Pan American Union, Washington, D. C.

Post Office Department, Washington, D. C.

Treasury Department, Washington, D. C.; U. S. Secret Service.

State Government Departments and Agencies

Visual aids may be obtained from the following state and territorial departments and agencies:

Arizona State Office of Public Instruction, Phoenix, Ariz.

Arkansas Geological Survey, 447 State Capitol, Little Rock, Ark.

California State Division of Mines, Department of Natural Resources, Ferry Bldg., San Francisco, Calif.

Colorado State Game and Fish Commission, State Capitol, Denver, Colo.

Commonwealth of the Philippines, Bureau of Education, Manila, P. I.

Connecticut State Department of Health, 166 Capital Ave., Hartford, Conn.

Delaware State Board of Education, Dover, Del.

Delaware State Board of Game and Fish Commissioners, Dover, Del.

Florida Forest and Park Service, Tallahassee, Fla.

Government of Puerto Rico, Institute of Tourism, 630 Fifth Ave., New York, N. Y.

Idaho Fish and Game Department, Boise, Idaho.

Illinois State Department of Public Health, Springfield, Ill.

Iowa State Conservation Commission, Des Moines, Iowa.

Massachusetts State Department of Public Health, Division of Child Hygiene, 1 Beacon St., Boston, Mass.

Michigan Department of Conservation, Educational Division, Lansing, Mich.
Minnesota Department of Conservation, Bureau of Education, State Office Bldg., St. Paul, Minn.
Mississippi State Game and Fish Commission, Jackson, Miss.
Montana State Planning Board, Helena, Mont.
Nevada State Engineer, Carson City, Nev.
New Hampshire Forestry and Recreation Department, Concord, N. H.
New York State Conservation Department, Broadway Arcade Bldg., Albany, N. Y.
New York State Department of Health, Division of Public Health Education, State Office Bldg., Albany, N. Y.
Ohio State Department of Education, Visual Instruction Exchange, Columbus, Ohio.
Ohio State Division of Conservation and Natural Resources, Columbus, Ohio.
Oklahoma Geological Survey, Norman, Okla.
Oregon State System of Higher Education, Department of Visual Instruction, Corvallis, Ore.
Pennsylvania Department of Forests and Waters, Harrisburg, Pa.
Puerto Rico Department of Education, Bureau of Adult and Extension Activities, San Juan, P. R.
State of Ohio Department of Education, Visual Instruction Exchange, Columbus, Ohio.
Tennessee State Department of Conservation, 310 State Office Bldg., Nashville, Tenn.
Texas State Department of Health, Austin, Tex.
Virginia Conservation Commission, Richmond, Va.
West Virginia Conservation Commission, Charleston, W. Va.
Wisconsin Conservation Department, State Capitol, Madison, Wis.
Wisconsin State Department of Public Instruction, Madison, Wis.
Wisconsin State Highway Commission, Madison, Wis.
Wyoming Game and Fish Department, Cheyenne, Wyo.

The colleges and universities and federal and state departments and agencies listed are rapidly developing large libraries of visual aids covering a multitude of educational and specific subject fields. Owing to the variable nature of this material, an attempt was not made to list all subject titles or their methods of distribution. However, up-to-date information will be supplied by these sources upon request. Contact your nearest source to save time and transportation charges.

Equipment and Supplies

As far as possible, it is recommended that visual aid equipment and supplies be purchased from reliable local dealers. This will usually provide a near-by point for servicing and repair and also a close and convenient source for new information. It would be impractical to list all stores and departments dealing with art supplies, stationery, photography, and other related equipment and

supplies. The following is, however, a partial listing of known producers and distributors of visual aids in the United States.

Motion Picture Projectors and Supplies

Academic Film Producing Co., 1650 Broadway, New York, N. Y.
J. F. Adams, Inc., 459 Washington St., Buffalo, N. Y.
Advertising Projectors, Inc., 10 W. 33d St., New York, N. Y.
Aircraft Engineering Co., 22 Raydol Ave., Secaucus, N. J.
John E. Allen, Inc., 6 George St., Rochester, N. Y.
American Bolex Co., Inc., 155 E. 44th St., New York, N. Y.
American Film Corp., 6227 N. Broadway, Chicago, Ill.
Ampro Corp., 2839 N. Western Ave., Chicago, Ill.
Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
R. B. Annis Co., 1515-1519 E. Michigan St., Indianapolis, Ind.
Arrow Film Service, 1600 Broadway, New York, N. Y.
W. A. Aschmann, 717 W. Wells St., Milwaukee, Wis.
Audio-film Libraries, 661 Bloomfield Ave., Bloomfield, N. J.
Audiofilms Co., 6109 Grove St., Oakland, Calif., and P. O. Box 27, South Berkeley, Calif.
Badger Film Service, 3314 N. Hackett Ave., Milwaukee, Wis.
Bailey Film Service, 1651 Cosmo St., Hollywood, Calif.
Bell and Howell Co., 1801-1815 Larchmont Ave., Chicago, Ill.
Paul L. Brand, 816 Connecticut Ave., Washington, D. C.
Camera Center, 596 Grand St., Brooklyn, N. Y.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Camera Supply Co., 1515 N. Cahuenga Blvd., Hollywood, Calif.
Capital Film Exchange, 1314 Vine St., Philadelphia, Pa.
Capitol Theatre Supply Co., 28 Piedmont St., Boston, Mass.
Central Camera Co., 230 S. Wabash Ave., Chicago, Ill.
Central Films, P. O. Box 163, Hastings, Mich.
Chesapeake and Ohio Lines, Cleveland, Ohio.
Church and School Film Service, 1635 Central Parkway, Cincinnati, Ohio.
Frank Church Films, 6117 Grove St., Oakland, Calif.
Cineculture National 16 mm. Distributors, 2901 Prairie Ave., Chicago, Ill.
Cinema, Inc., 234 Clarendon St., Boston, Mass.
Colson Motion Picture Service, 2040 Chatterton Ave., New York, N. Y.
Commercial Motion Picture Service, 456 Turner St., Allentown, Pa.
Community Program Service, 3707 East Ave., Berwyn, Ill.
Cosmopolitan Film Libraries, Inc., 3248 Gratiot Ave., Detroit, Mich.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
De Frenes & Co., 1909 Buttonwood St., Philadelphia, Pa.
Dejur-Amsco Corp., Long Island City, N. Y.
De Mornay-Budd, Inc., 475 Grand Concourse, New York, N. Y.
Wm. M. Dennis, 2506½ W. 7th St., Los Angeles, Calif.
Dennis Film Bureau, Wabash, Ind.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
De Vry Corp., 1111 Armitage Ave., Chicago, Ill.
Wm. H. Dudley Visual Education Service, 750 S. Wabash Ave., Chicago, Ill.
Eastin 16 mm. Picture Co., Davenport, Iowa.
Eastman Kodak Stores, Inc., Kodascope Libraries Division, 356 Madison Ave. at 45th St., New York, N. Y.

Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
Elliott Film Co., 72 Glenwood Ave., Minneapolis, Minn.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.
Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Excel Projector Corp., 4234 Drummond Pl., Chicago, Ill.
Eye Gate House, Inc., 330 W. 42nd St., New York, N. Y.
Film Bookings, 716 Federal St., Troy, N. Y.
Film Circulation Corp., 1600 Broadway, New York, N. Y.
Film City Pictures Co., P. O. Box 807, Hollywood, Calif.
Film Classic Exchange, 505 Pearl St., Buffalo, N. Y.
Film Preview, Inc., 1504 Hennepin Ave., Minneapolis, Minn.
Garrison Film Distributors, Inc., 1600 Broadway, New York, N. Y.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
General Film Library, 1426 Beachwood Drive, Hollywood, Calif.
G. Gennert, 20 W. 22d St., New York, N. Y.
Goodall Mfg. Co., Ogallala, Nebr.
J. C. Haile & Sons, Motion Picture Department, 215 Walnut St., Cincinnati, Ohio.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Hathen Productions, 1239 Summer St., Philadelphia, Pa.
Hebert Studios, Inc., 55 Allyn St., Hartford, Conn.
Louis H. Hill, 314 SW. 9th Ave., Portland, Ore.
Hollywood Camera Exchange, 1600 Cahuenga Blvd., Los Angeles, Calif.
Holmes Projector Co., 1815 Orchard St., Chicago, Ill.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Home Movies Studio, Inc., 2019 Euclid Ave., Cleveland, Ohio.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Ideal Motion Picture Service, 393 St. John's Ave., Yonkers, N. Y.
Ideal Pictures Corp., 28-34 E. 8th St., Chicago, Ill.
Institutional Cinemaservice, Inc., 1560 Broadway, New York, N. Y.
International Film Bureau, 59 E. Van Buren St., Chicago, Ill.
International Projector Corp., 88-96 Gold St., New York, N. Y.
Iver Johnson Sport Goods Co., 155 Washington St., Boston, Mass.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kansas City Sound Service Co., 1818 Wyandotte St., Kansas City, Mo.
Kelly Studios, 14 E. 10th St., Erie, Pa.
Keystone Manufacturing Co., 288 A St., Boston, Mass.
King Cole's Sound Service, Inc., 203 E. 26th St., New York, N. Y.
Wm. Kopp, Inc., 2825 Hennepin Ave., Minneapolis, Minn.
J. C. Kretschmer & Co., 315 S. 17th St., Omaha, Nebr., and 136 S. 13th St., Lincoln, Nebr.
Kunz Motion Picture Service, Inc., 1319 Vine St., Philadelphia, Pa.
Landres 16 mm. Pictures, 1426 N. Beachwood Drive, Hollywood, Calif.
Langevin Co., Inc., 1050 Howard St., San Francisco, Calif.
Lee Film Co., 716 E. Elmira St., San Antonio, Tex.
Lewis Film Service, 105 E. 1st St., Wichita, Kans.
MacCallum Pictures, Inc., 4729 Ludlow St., Philadelphia, Pa.
Manse Film Library, 1521 Dana Ave., Cincinnati, Ohio.
Melmoy Picture Service, 615 E. 30th St., Indianapolis, Ind.

Metropolitan Motion Picture Co., Fisher Bldg., Detroit, Mich.
Metropolitan Motion Picture Co., 50 Branford Pl., Newark, N. J.
Michigan Film Library, 15745 Rosemont Road, Detroit, Mich.
Mills Industries, Incorp., 4100 Fullerton Ave., Chicago, Illinois.
Modern Sound Pictures, Inc., 1219 Farnum St., Omaha, Nebr.
Modern Talking Picture Service, 9 Rockefeller Plaza, New York, N. Y.
Mogull's, Inc., 68 W. 48th St., New York, N. Y.
R. F. Mortimer, 103 W. 4th St., Plainfield, N. J.
Motion Picture Service, 5514 University Way, Seattle, Wash.
R. C. Mulnix Sound Systems, 310 15th St., Denver, Colo.
Murray Motion Picture Service Co., 640 Reibold Bldg., Dayton, Ohio.
Music Specialty Co., Union City, Ind.
National Camera Exchange, 5 S. 5th St., Minneapolis, Minn.
National Industries, Inc., 2638 Pulaski Road, Chicago, Illinois.
National Motion Picture Service, 236 W. 55th St., New York, N. Y.
National Theatre Supply Co., 92 Gold St., New York, N. Y.
Ohio Film Service, 1377 Penhurst Road, Cleveland, Ohio.
Paramount Mfg. Co., P. O. Box 224, Back Bay Station, Boston, Mass.
Pathescope Co. of the Northwest, 438 Stuart St., Boston, Mass.
Ernest K. Pearson and Co., 345 Lonsdale Ave., Pawtucket, R. I.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Pictorial Films, Inc., 1650 Broadway, New York, N. Y.
Pictur-Fone Co., 806-808 S. Main St., Lima, Ohio.
Pinckney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.
A. G. Pope, Bogalusa, La.
Pratt Sound Film Service, Cedar Rapids, Iowa.
Ramsey Pictures, Ramsey Tower, Oklahoma City, Okla.
RCA Manufacturing Co., Inc., Educational Department, Camden, N. J.
Reagan Visual Education Co., Rhodes Bldg., Atlanta, Ga.
J. C. Reiss, 10 Hill St., Newark, N. J.
Reiss Public Address Systems, 7629 E. Jefferson Ave., Detroit, Mich.
Rocky Mountain Booking Co., Symes Bldg., Denver, Colo.
Russell C. Roshon, 520 State Theatre Bldg., Pittsburgh, Pa.
Frank L. Rouser Co., 317 W. Church Ave., Knoxville, Tenn.
Ruby Camera Exchange, Inc., 729 Seventh Ave., New York, N. Y.
Scioto Movie Supply, P. O. Box 134, Portsmouth, Ohio.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
S. O. S. Cinema Supply Corp., 636 11th Ave., New York, N. Y.
Southern Visual Equipment Co., 494 S. 2d St., Memphis, Tenn.
J. M. Stackhouse, Lake Junaluska, N. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
D. A. Stewart, Motion Pictures, P. O. Box 396, Mount Vernon, N. Y.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Swank Motion Pictures, 5861 Plymouth, St. Louis, Mo.
G. R. Taylor & Co., Inc., 1000 Orrington Ave., Irvington, N. J.
Technical Service, Inc., 693 Monroe St., Detroit, Mich.
Texas Visual Educational Co., 305 W. 10th St., Austin, Tex.
E. B. Thompson, 2037 K St., Washington, D. C.
Howard E. Thompson, Mt. Airy, Md.
Twyman Films, Inc., 29 Central Ave., Dayton, Ohio.
United Projector Film Corp., 228 Franklin St., Buffalo, N. Y.
Universal Camera Corp., Chicago, Illinois.

Universal Sound Projectors, Division of Sentry Safety Control Corp., 1917-1921 Oxford St., Philadelphia, Pa.
Veragraph Film Corp., 145 W. 45th St., New York, N. Y.
Victor Animatograph Corp., Davenport, Iowa.
Vogan Engineering Sales, 9236 S. Elizabeth St., Chicago, Ill.
Weber Machine Corp., 59 Rutter St., Rochester, N. Y.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Wenzel Co., 2509 S. State St., Chicago, Ill.
Westcott, Slade, & Balcom, 95 Empire St., Providence, R. I.
Western Movie Supply Co., 254 Sutter St., San Francisco, Calif.
Westing Films Service, 501 Euclid, Des Moines, Iowa.
Wholesome Photo Service, Inc., 48 Melrose St., Boston, Mass.
Williams, Brown, & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Clem Williams Films, 403 Diamond Bank Bldg., Pittsburgh, Pa.
Willoughby Camera Stores, Inc., 110 W. 32d St., New York, N. Y.
Zenith Sound Projector Co., 33 W. 60th St., New York, N. Y.

Discussional Stripfilm and Sound Slidefilm Projectors and Supplies

J. F. Adams, Inc., 459 Washington St., Buffalo, N. Y.
John E. Allen, Inc., 6 George St., Rochester, N. Y.
American Film Corporation, 6227 N. Broadway, Chicago, Ill.
Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
R. B. Annis Co., 1515-1519 E. Michigan St., Indianapolis, Ind.
Audiofilms Co., 6109 Grove St., Oakland, Calif., and P. O. Box 27, South Berkeley, Calif.
Bausch & Lomb Co., 635 St. Paul St., Rochester, N. Y.
Best Devices Co., 10516 Western Ave., Cleveland, Ohio.
Bond Slide Co., 68 W. Washington St., Chicago, Ill.
Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Paul L. Brand, 816 Connecticut Ave., Washington, D. C.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Camera Supply Co., 1515 N. Cahuenga Blvd., Hollywood, Calif.
Capitol Theatre Supply Co., 28 Piedmont St., Boston, Mass.
Central Camera Co., 230 S. Wabash Ave., Chicago, Ill.
Central Films, P. O. Box 163, Hastings, Mich.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Chicago Slide Co., 6 E. Lake St., Chicago, Ill.
Commercial Motion Picture Service, 456 Turner St., Allentown, Pa.
Conrad Slide and Projection Co., 709 E. 8th St., Superior, Wis.
L. E. Davidson Picture Service, Angola, N. Y.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
Dennoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Des Moines Slide Co., Des Moines, Iowa.
Eastman Kodak Stores, Inc., Kodascope Libraries Division, 356 Madison Ave., at 45th St., New York, N. Y.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.

Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Eye Gate House, Inc., 330 W. 42d St., New York, N. Y.
Film Bookings, 716 Federal St., Troy, N. Y.
Film Preview, Inc., 1504 Hennepin Ave., Minneapolis, Minn.
Folmer Graflex Corp., Rochester, N. Y.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
General Film Library, 1426 N. Beachwood Drive, Hollywood, Calif.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
J. C. Haile & Sons, Motion Picture Department, 215 Walnut St., Cincinnati, Ohio.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Hathen Productions, 1239 Summer St., Philadelphia, Pa.
Hebert Studios, Inc., 55 Allyn St., Hartford, Conn.
Louis H. Hill, 314 SW. 9th Ave., Portland, Ore.
Hollywood Camera Exchange, 1600 Cahuenga Blvd., Los Angeles, Calif.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Ideal Pictures Corp., 28-34 E. 8th St., Chicago, Ill.
Institutional Cinemaservice, Inc., 1560 Broadway, New York, N. Y.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.
Iver Johnson Sport Goods Co., 155 Washington St., Boston, Mass.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kelly Studios, 14 E. 10th St., Erie, Pa.
Keystone View Co., Meadville, Pa.
King Cole's Sound Service, Inc., 203 E. 26th St., New York, N. Y.
Wm. Kopp, Inc., 2825 Hennepin Ave., Minneapolis, Minn.
J. C. Kretschmer & Co., 315 S. 17th St., Omaha, Nebr., and 136 S. 13th St., Lincoln, Nebr.
Langevin Co., Inc. (Modern Talking Picture Service), 1050 Howard St., San Francisco, Calif.
Lee Film Co., 716 E. Elmira St., San Antonio, Tex.
E. Leitz, Inc., 60 E. 10th St., New York, N. Y.
MacCallum Pictures, Inc., 4729 Ludlow St., Philadelphia, Pa.
McIntosh Stereopticon Co., 549 W. Randolph St., Chicago, Ill.
McKinley Publishing Co., 1021 Filbert St., Philadelphia, Pa.
Magnavox Company, Fort Wayne, Indiana.
Manse Film Library, 1521 Dana Ave., Cincinnati, Ohio.
Melmoy Picture Service, 615 E. 30th St., Indianapolis, Ind.
Metropolitan Motion Picture Co., Fisher Bldg., Detroit, Mich.
Michigan Film Library, 15745 Rosemont Road, Detroit, Mich.
Modern Sound Pictures, Inc., 1219 Farnum St., Omaha, Nebr.
Modern Talking Picture Service, 9 Rockefeller Plaza, New York, N. Y.
Mogull's, Inc., 68 W. 48th St., New York, N. Y.
R. F. Mortimer, 103 W. 4th St., Plainfield, N. J.
R. C. Mulnix Sound Systems, 310 15th St., Denver, Colo.
Murray Motion Picture Service Co., 640 Reibold Bldg., Dayton, Ohio.
National Camera Exchange, 5 S. 5th St., Minneapolis, Minn.
National Motion Picture Service, 236 W. 55th St., New York, N Y.
National Studios, 145 W. 45th St., New York, N. Y.
Paramount Mfg. Co., P. O. Box 224, Back Bay Station, Boston, Mass.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Pinckney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.

Reagan Visual Education Co., Rhodes Bldg., Atlanta, Ga.
J. C. Reiss, 10 Hill St., Newark, N. J.
Reiss Public Address Systems, 7629 E. Jefferson Ave., Detroit, Mich.
Frank L. Rouser Co., 317 W. Church Ave., Knoxville, Tenn.
Ruby Camera Exchange, Inc., 729 Seventh Ave., New York, N. Y.
Scioto Movie Supply, P. O. Box 134, Portsmouth, Ohio.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
Society for Visual Education, Inc., 100 E. Ohio St., Chicago, Ill.
S. O. S. Cinema Supply Corp., 636 Eleventh Ave., New York, N. Y.
Southern Visual Equipment Co., 494 S. 2d St., Memphis, Tenn.
Spencer Lens Co., 19 Doat St., Buffalo, N. Y.
Spindler & Sauppe, Inc., 86 Third St., San Francisco, Calif.
J. M. Stackhouse, Lake Junaluska, N. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I
D. A. Stewart, Motion Pictures, P. O. Box 396, Mount Vernon, N. Y.
Stillfilm, Inc., 4703-4705 W. Pico Blvd., Los Angeles, Calif.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Texas Visual Education Co., 305 W. 10th St., Austin, Tex.
E. B. Thompson, 2037 K St., Washington, D. C.
Howard E. Thompson, Mt. Airy, Md.
United Projector Film Co., 228 Franklin St., Buffalo, N. Y.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Westcott, Slade & Balcom, 95 Empire St., Providence, R. I.
Western Movie Supply Co., 254 Sutter St., San Francisco, Calif.
Westing Photo Service, 501 Euclid, Des Moines, Iowa.
Wholesome Films Service, Inc., 48 Melrose St., Boston, Mass.
Williams, Brown, & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Willoughby Camera Stores, Inc., 110 W. 23d St., New York, N. Y.
Zenith Sound Projector Co., 33 W. 60th St., New York, N. Y.

Slide Projectors, Attachments, and Supplies

J. F. Adams, Inc., 459 Washington St., Buffalo, N. Y.
John E. Allen, Inc., 6 George St., Rochester, N. Y.
Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
Art Education, Inc., 35 W. 34th St., New York, N. Y.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.
Best Devices Co., 10516 Western Ave., Cleveland, Ohio.
Bond Slide Co., 68 W. Washington St., Chicago, Ill.
Paul L. Brand, 816 Connecticut Ave., Washington, D. C.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Camera Supply Co., 1515 Cahuenga Blvd., Hollywood, Calif.
Campbell Photo Service, Inc., 917 F St. N.W., Washington, D. C.
Capitol Theater Supply Co., 28 Piedmont St., Boston, Mass.
Central Camera Co., 230 S. Wabash Ave., Chicago, Ill.
Central Films, P. O. Box 163, Hastings, Mich.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Chicago Slide Co., 6 E. Lake St., Chicago, Ill.
Commercial Motion Picture Service, 456 Turner St., Allentown, Pa.
Conrad Slide and Projection Co., 709 E. 8th St., Superior, Wis.
Craftsmen Photo Co., Inc., 245 W. 55th St., New York, N. Y.

D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Des Moines Slide Co., Des Moines, Iowa.
Eastman Kodak Stores, Inc., Kodascope Libraries Division, 356 Madison Ave. at 45th St., New York, N. Y.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.
Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Eye Gate House, Inc., 330 W. 42d St., New York, N. Y.
Film Bookings, 716 Federal St., Troy, N. Y.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
G. Gennert, 20 W. 22d St., New York, N. Y.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
J. C. Haile & Sons, Motion Picture Department, 215 Walnut St., Cincinnati, Ohio.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Hathen Productions, 1239 Summer St., Philadelphia, Pa.
Hebert Studios, Inc., 55 Allyn St., Hartford, Conn.
Hollywood Camera Exchange, 1600 Cahuenga Blvd., Los Angeles, Calif.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
House of Art, 33 W. 34th St., New York, N. Y.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Ideal Pictures Corp., 28-34 Eighth St., Chicago, Ill.
Institutional Cinemaservice, Inc., 1560 Broadway, New York, N. Y.
International Research Corp., Ann Arbor, Mich.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.
Iver Johnson Sport Goods Co., 155 Washington St., Boston, Mass.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kansas City Slide Mfg. Co., 1719 Wyandotte, Kansas City, Mo.
Kelly Studios, 14 E. 10th St., Erie, Pa.
Keystone View Co., Meadville, Pa.
King Cole's Sound Service, Inc., 203 E. 26th St., New York, N. Y.
J. C. Kretschmer & Co., 315 S. 17th St., Omaha, Nebr., and 136 S. 13th St., Lincoln, Nebr.
Kunz Motion Picture Service, Inc., 1319 Vine St., Philadelphia, Pa.
Lee Film Co., 716 E. Elmira St., San Antonio, Tex.
E. Leitz, Inc., 60 E. 10th St., New York, N. Y.
McIntosh Stereopticon Co., 549 W. Randolph St., Chicago, Ill.
Melmoy Picture Service, 615 E. 30th St., Indianapolis, Ind.
Metropolitan Motion Picture Co., Fisher Bldg., Detroit, Mich.
Michigan Film Library, 15745 Rosemont Road, Detroit, Mich.
Modern Sound Pictures, Inc., 1219 Farnum St., Omaha, Nebr.
Modern Talking Picture Service, 9 Rockefeller Plaza, New York, N. Y.
Mogull's, Inc., 68 W. 48th St., New York, N. Y.
R. F. Mortimer, 103 W. 4th St., Plainfield, N. J.
Murray Motion Picture Service Co., 640 Reibold Bldg., Dayton, Ohio.
National Camera Exchange, 5 S. 5th St., Minneapolis, Minn.
National Motion Picture Service, 236 W. 55th St., New York, N. Y.

National Studios, 145 W. 45th St., New York, N. Y.
Paramount Mfg. Co., P. O. Box 224, Back Bay Station, Boston, Mass.
Pathescope Co. of the Northwest, 438 Stuart St., Boston, Mass.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Pratt Sound Film Service, Cedar Rapids, Iowa.
Quality Slide Co., 6 E. Lake St., Chicago, Ill.
Reagan Visual Education Co., Rhodes Bldg., Atlanta, Ga.
J. C. Reiss, 10 Hill St., Newark, N. J.
Rocky Mountain Booking Co., Symes Bldg., Denver, Colo.
Frank L. Rouser Co., 317 W. Church Ave., Knoxville, Tenn.
Ruby Camera Exchange, Inc., 729 Seventh Ave., New York, N. Y.
Scioto Movie Supply, P. O. Box 134, Portsmouth, Ohio.
Sims Visual Music Co., Quincy, Ill.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
S. O. S. Cinema Supply Corp., 636 Eleventh Ave., New York, N. Y.
Southern Visual Equipment Co., 494 S. 2d St., Memphis, Tenn.
Spencer Lens Co., 19 Doat St., Buffalo, N. Y.
Spindler & Sauppe, Inc., 86 Third St., San Francisco, Calif.
J. M. Stackhouse, Lake Junaluska, N. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
D. A. Stewart, Motion Pictures, P. O. Box 396, Mount Vernon, N. Y.
Stillfilm, Inc., 4703-4705 W. Pico Blvd., Los Angeles, Calif.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Texas Visual Education Co., 305 W. 10th St., Austin, Tex.
E. B. Thompson, 2037 K St., Washington, D. C.
Howard E. Thompson, Mt. Airy, Md.
Twyman Films, Inc., 29 Central Ave., Dayton, Ohio.
United Projector Film Corp., 228 Franklin St., Buffalo, N. Y.
Victor Animatograph Corp., Davenport, Iowa.
Vogan Engineering Sales, 9236 S. Elizabeth St., Chicago, Ill.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Westcott, Slade, & Balcom, 95 Empire St., Providence, R. I.
Westing Photo Service, 501 Euclid, Des Moines, Iowa.
Wholesome Films Service, Inc., 48 Melrose St., Boston, Mass.
Williams, Brown, & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Willoughby Camera Stores, Inc., 110 W. 32d St., New York, N. Y.

Training Slides

Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
Angelus Press, 1240 S. Main St., Los Angeles, Calif.
Art Education, Inc., 35 W. 34th St., New York, N. Y.
Art Reference Bureau, 18 E. 41st St., New York, N. Y.
Beseler Lantern Slide Co., 131 E. 23d St., New York, N. Y.
Bond Slide Co., 68 W. Washington St., Chicago, Ill.
Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Paul L. Brand, 816 Connecticut Ave., Washington, D. C.
Burbank, Inc., Plymouth, Mass.
L. H. Caldwell, 1506 N. Vassar, Wichita, Kans.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Central Camera Co., 230 S. Wabash Ave., Chicago, Ill.

Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Chicago Slide Co., 6 E. Lake St., Chicago, Ill.
Conrad Slide and Projection Co., 709 E. 8th St., Superior, Wis.
Edith M. Cook Projects, Westtown, Pa.
Craftsmen Photo Co., Inc., 245 W. 55th St., New York, N. Y.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Des Moines Slide Co., Des Moines, Iowa.
Wm. H. Dudley Visual Education Service, 750 S. Wabash Ave., Chicago, Ill.
Eastman Educational Slides, 501 Iowa State Bank Bldg., Iowa City, Iowa.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.
Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Eye Gate House, Inc., 330 W. 42d St., New York, N. Y.
Fairchild Aerial Surveys, Inc., 224 E. 11th St., Los Angeles, Calif.
Film Bookings, 716 Federal St., Troy, N. Y.
William J. Ganz Co., 19 E. 47th St., New York, N. Y.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
Geo-Aero-Photo, P. O. Box 750, Oklahoma City, Okla.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Guy D. Haselton, 7936 Santa Monica Blvd., Hollywood, Calif.
Hathen Productions, 1239 Summer St., Philadelphia, Pa.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Home Movies Studio, Inc., 2019 Euclid Ave., Cleveland, Ohio.
House of Art, 33 W. 34th St., New York, N. Y.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kansas City Slide Mfg. Co., 1719 Wyandotte, Kansas City, Mo.
Keystone View Co., Meadville, Pa.
King Cole's Sound Service, Inc., 203 E. 26th St., New York, N. Y.
J. C. Kretschmer & Co., 315 S. 17th St., Omaha, Nebr., and 136 S. 13th St., Lincoln, Nebr.
Kunz Motion Picture Service, Inc., 1319 Vine St., Philadelphia, Pa.
McIntosh Stereopticon Co., 549 W. Randolph St., Chicago, Ill.
Master Photographers, Inc., 445 W. 41st St., New York, N. Y.
R. F. Mortimer, 103 W. Fourth St., Plainfield, N. J.
National Motion Picture Service, 236 W. 55th St., New York, N. Y.
Francis S. Onderdonk, 1331 Geddes Ave., Ann Arbor, Mich.
Photographic History Service, 5127 Franklin Ave., Hollywood, Calif.
Pickney Film Service Co., 1026 Forbes St., Pittsburgh, Pa.
Pictorial Statistics, Inc., 142 Lexington Ave., New York, N. Y.
Arthur C. Pillsbury, 640 Arlington Ave., Berkeley, Calif.
Pratt Sound Film Service, Cedar Rapids, Iowa.
Quality Slide Co., 6 E. Lake St., Chicago, Ill.
Radio-Mat Slide Co., 1819 Broadway, New York, N. Y.
Rand McNally Co., 536 S. Clark St., Chicago, Ill.
Ransley Studios, Rock Haven, Ky.

Raymond & Raymond, Inc., 40 E. 52nd St., New York, N. Y.
J. C. Reiss, 10 Hill St., Newark, N. J.
Rolab Photo-Science Laboratories, Sandy Hook, Conn.
Ruroy Sibley, 39 High St., Croton-on-Hudson, N. Y.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
Sims Visual Music Co., Quincy, Ill.
S. O. S. Cinema Supply Corp., 636 11th Ave., New York, N. Y.
J. M. Stackhouse, Lake Junaluska, S. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
E. B. Thompson, 2037 K St., Washington, D. C.
Howard E. Thompson, Mt. Airy, Md.
University Prints, 11 Boyd St., Boston, Mass.
Victor Animatograph Corp., Davenport, Iowa.
Ward's Natural Science Establishment, Inc., Rochester, N. Y.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Wholesome Films Service, Inc., 48 Melrose St., Boston, Mass.
Williams, Brown & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Zenith Sound Projector Co., 33 W. 60th St., New York, N. Y.

Opaque Projectors, Attachments, and Supplies

J. F. Adams, Inc., 459 Washington St., Buffalo, N. Y.
Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
Audiofilms Co., 6109 Grove St., Oakland, Calif., and P. O. Box 27, South Berkeley, Calif.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.
Bond Slide Co., 68 W. Washington St., Chicago, Ill.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Campbell Photo Service, Inc., 917 F St., N.W., Washington, D. C.
Capitol Theatre Supply Co., 28 Piedmont St., Boston, Mass.
Central Camera Co., 230 S. Wabash Ave., Chicago, Ill.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Chicago Slide Co., 6 E. Lake St., Chicago, Ill.
Commercial Motion Picture Service, 456 Turner St., Allentown, Pa.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Des Moines Slide Co., Des Moines, Iowa.
Eastman Kodak Stores, Inc., Kodasccope Libraries Division, 356 Madison Ave., at 45th St., New York, N. Y.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.
Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Eye Gate House, Inc., 330 West 42d St., New York, N. Y.
General Biological Supply House, Inc., 761 East 69th Place, Chicago, Ill.
G. Gennert, 20 West 22d St., New York, N. Y.
A. J. Griner Co., 417 East 13th St., Kansas City, Mo.

J. C. Haile & Sons, Motion Picture Department, 215 Walnut St., Cincinnati, Ohio.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfield, Inc., 600 Baronne St., New Orleans, La.
Hebert Studios, Inc., 55 Allyn St., Hartford, Conn.
Hollywood Camera Exchange, 1600 Cahuengo Blvd., Los Angeles, Calif.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.
Iver Johnson Sport Goods Co., 155 Washington St., Boston, Mass.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kelly Studios, 14 E. 10th St., Erie, Pa.
Keystone Mfg. Co., 288 A St., Boston, Mass.
Keystone View Co., Meadville, Pa.
J. C. Kretschmer & Co., 315 S. 17th St., Omaha, Nebr., and 136 S. 13th St., Lincoln, Nebr.
E. Leitz, Inc., 60 E. 10th St., New York, N. Y.
McIntosh Stereopticon Co., 549 W. Randolph St., Chicago, Ill.
Melmoy Picture Service, 615 E. 30th St., Indianapolis, Ind.
Mogull's Inc., 68 W. 48th St., New York, N. Y.
R. F. Mortimer, 103 W. 4th St., Plainfield, N. J.
National Camera Exchange, 5 S. 5th St., Minneapolis, Minn.
National Studios, 145 W. 45th St., New York, N. Y.
Paramount Manufacturing Co., P. O. Box 224, Back Bay Station, Boston, Mass.
Pathescope Co., of the Northeast, 438 Stuart St., Boston, Mass.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Pratt Sound Film Service, Cedar Rapids, Iowa.
Reagan Visual Education Co., Rhodes Bldg., Atlanta, Ga.
J. C. Reiss, 10 Hill St., Newark, N. J.
Rolab Photo-Science Laboratories, Sandy Hook, Conn.
Frank L. Rouser Co., 317 W. Church Ave., Knoxville, Tenn.
Ruby Camera Exchange, Inc., 729 7th Ave., New York, N. Y.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
S. O. S. Cinema Supply Corp., 636 11th Ave., New York, N. Y.
Southern Visual Equipment Co., 494 S. 2d St., Memphis, Tenn.
Spencer Lens Co., 19 Doat St., Buffalo, N. Y.
Spindler & Sauppe, Inc., 86 3d St., San Francisco, Calif.
J. M. Stackhouse, Lake Junaluska, N. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
D. A. Stewart, Motion Pictures, P. O. Box 396, Mount Vernon, N. Y.
Texas Visual Education Co., 305 W. 10th St., Austin, Tex.
E. B. Thompson, 2037 K St., Washington, D. C.
Howard E. Thompson, Mt. Airy, Md.
United Projector Film Corp., 228 Franklin St., Buffalo, N. Y.
Vogan Engineering Sales, 9236 S. Elizabeth St., Chicago, Ill.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Westcott, Slade, & Balcom, 95 Empire St., Providence, R. I.
Westing Photo Service, 501 Euclid, Des Moines, Iowa.
Wholesome Films Service, Inc., 48 Melrose St., Boston, Mass.
Williams, Brown & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Willoughby Camera Stores, Inc., 110 W. 32d St., New York, N. Y.

Pictures and Photographs

Abrams Aerial Survey Corp., 606 E. Shiawassee St., Lansing, Mich.
American Bemberg Corporation, 261 Fifth Ave., New York, N. Y.
Art Education, Inc., 35 W. 34th St., New York, N. Y.
Artext Prints, Inc., The Art Extension Press, Westport, Conn.
Art Reference Bureau, 18 E. 41st St., New York, N. Y.
Baltimore and Ohio Railroad, Public Relations Department, Baltimore, Md.
Bird Haven, Reseda, Calif.
Martha E. Bonham, 2642 Idlewood Road, Cleveland Heights, Ohio.
Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Milton Bradley Co., New Brunswick, N. J.
George P. Brown, Beverly, Mass.
A. Bruderhausen, 122 Ridgewood Ave., Yonkers, N. Y.
Burbank, Inc., Plymouth, Mass.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Campbell Photo Service, Inc., 917 F St., N.W., Washington, D. C.
Chicago Slide Co., 6 E. Lake St., Chicago, Ill.
Charles W. Clark Co., 240 Madison Ave., New York, N. Y.
Colonial Art Co., 1336-1338 N.W. First St., Oklahoma City, Okla.
Edith M. Cook Projects, Westtown, Pa.
Craftsmen Photo Co., Inc., 245 W. 55th St., New York, N. Y.
Creative Educational Society, Visualized Curriculum Series, Mankato, Minn.
Curtis Cameron Co., 221 Columbus Ave., Boston, Mass.
Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
De Vry Corp., 1111 Armitage Ave., Chicago, Ill.
Educational and Recreational Guides, Inc., 1501 Broadway, N. Y.
Elson Co., Inc., Locust St., Belmont, Mass.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Ewing Galloway, 420 Lexington Ave., New York, N. Y.
Fairbairn Publishers, Waldwick, N. J.
Fairchild Aerial Surveys, Inc., 224 E. 11th St., Los Angeles, Calif.
Film Bookings, 716 Federal St., Troy, N. Y.
Friendship Press, 156 Fifth Ave., New York, N. Y.
Philip D. Gendreau, 369 Lexington Ave., New York, N. Y.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
Geo-Aero-Photo, P. O. Box 750, Oklahoma City, Okla.
Good Housekeeping, 57th St. at Eighth Ave., New York, N. Y.
J. Greenwald, 681 Lexington Ave., New York, N. Y.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
Grolier Society, Inc., 2 W. 45th St., New York, N. Y.
Hale, Cushman, & Flint, 116 Newbury St., Boston, Mass.
E. S. Herrmann, Inc., 385 Madison Ave., New York, N. Y.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
House of Art, 33 W. 34th St., New York, N. Y.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Industrial Arts Cooperative Service, Inc., 519 W. 121st St., New York, N. Y.
International Art Publishing Co., 902 Marquette Bldg., and 243 W. Congress, Detroit, Mich.
International News Photos, 235 E. 45th St., New York, N. Y.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.

J. C. Kretschmer & Co., 315 S. 17th St. Omaha, Nebr.
J. S. Latta & Son, Cedar Falls, Iowa.
Lee Film Co., 716 E. Elmira St., San Antonio, Tex.
Fred Leighton, 15 E. 8th St., New York, N. Y.
Rudolph Lesch Arts, Inc., 225 Fifth Ave., New York, N. Y.
Living American Art, Inc., 315 Fourth Ave., New York, N. Y.
Longmans, Green & Co., 56 Fifth Ave., New York, N. Y.
McKinley Publishing Co., 1021 Filbert St., Philadelphia, Pa.
Master Photographers, Inc., 445 W. 41st St., New York, N. Y.
George R. Momyer, Indian Arts and Crafts, 928 Cajon St., Redlands, Calif.
National Studios, 145 W. 45th St., New York, N. Y.
Newson & Co., 4620 Ravenswood Ave., Chicago, Ill., and 72 Fifth Ave., New York, N. Y.
New York Graphic Society, Inc., 10 West 33d St., New York, N. Y.
A. J. Nystrom & Co., 3333 Elston Ave., Chicago, Ill.
F. A. Owen Publishing Co., Dansville, N. Y.
Perry Pictures Co., Malden, Mass.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Photographic History Service, 5127 Franklin Ave., Hollywood, Calif.
Pictorial Statistics, Inc., 142 Lexington Ave., New York, N. Y.
Practical Drawing Co., Dallas, Tex.
Quarrie Corp., 35 E. Wacker Drive, Chicago. Ill.
Ramsey Pictures, Ramsey Tower, Oklahoma City, Okla.
Raymond & Raymond, Inc., 40 E. 52d St., New York, N. Y.
Rolab Photo-Science Laboratories, Sandy Hook, Conn.
Ruroy Sibley, 39 High St., Croton-on-Hudson, New York.
School Films, Inc., 7936 Santa Monica Blvd., Los Angeles, Calif.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Thompson Publishing Co., 259 Kensington Pl., Syracuse, N. Y.
Raphael Tuck & Sons, 200 Fifth Ave., New York, N. Y.
Universal Distributors Co., 38 Union Square, New York, N. Y.
University Prints, 11 Boyd St., Boston, Mass.
Veragraph Film Corp., 145 W. 45th St., New York, N. Y.
Ward's Natural Science Establishment, Inc., Rochester, N. Y.
Williams, Brown & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Yosemite Park & Curry Co., Yosemite National Park, Calif.

Stereographs and Third-Dimension Pictures

Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
Fairchild Aerial Surveys, Inc., 224 E. 11th St., Los Angeles, Calif.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Keystone View Co., Meadville, Pa.
Kunz Motion Picture Service, Inc., 1319 Vine St., Philadelphia, Pa.
E. Leitz, Inc., 60 E. 10th St., New York, N. Y.
Newson & Co., 4620 Ravenswood Ave., Chicago, Ill., and 72 Fifth Ave., New York, N. Y.

Rolab Photo-Science Laboratories, Sandy Hook, Conn.
Sawyer's, Box 490, Portland, Oreg.
J. M. Stackhouse, Lake Junaluska, N. C.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.

Cameras, Attachments, and Supplies

J. F. Adams, Inc., 459 Washington St., Buffalo, N. Y.
American Bolex Co., 521 Fifth Ave., New York, N. Y.
American Film Corporation, 6227 N. Broadway, Chicago, Ill.
Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
R. B. Annis Co., 1515-1519 E. Michigan St., Indianapolis, Ind.
Ansco Corporation, Binghamton, N. Y.
Argus, Ann Arbor, Michigan.
W. A. Aschmann, 717 W. Wells St., Milwaukee, Wis.
Bailey Film Service, 1651 Cosmo St., Hollywood, Calif.
Bell & Howell Co., 1801-1815 Larchmont Ave., Chicago, Ill.
Bond Slide Co., 68 W. Washington St., Chicago, Ill.
Paul L. Brand, 816 Connecticut Ave., Washington, D. C.
Camera Center, 596 Grand St., Brooklyn, N. Y.
Camera Shoppe, 1920 N. Broadway, Oklahoma City, Okla.
Camera Supply Co., 1515 N. Cahuenga Blvd., Hollywood, Calif.
Campbell Photo Service, Inc., 917 F St., NW., Washington, D. C.
Capital Theatre Supply Co., 28 Piedmont St., Boston, Mass.
Central Films, P. O. Box 163, Hastings, Mich.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Colson Motion Picture Service, 2040 Chatterton Ave., New York, N. Y.
Commercial Motion Picture Service, 456 Turner St., Allentown, Pa.
Community Program Service, 3707 East Ave., Berwyn, Ill.
Cosmopolitan Film Libraries, Inc., 3248 Gratiot Ave., Detroit, Mich.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
De Vry Corp., 1111 Armitage Ave., Chicago, Ill.
Eastman Kodak Stores, Inc., Kodascope Libraries Division, 356 Madison Ave. at 45th St., New York, N. Y.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.
Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Fairchild Aerial Surveys, Inc., 224 E. 11th St., Los Angeles, Calif.
Film Bookings, 716 Federal St., Troy, N. Y.
Film Preview, Inc., 1504 Hennepin Ave., Minneapolis, Minn.
Folmer Graflex Corp., Rochester, N. Y.
General Biological Supply House, Inc., 761 East 69th Pl., Chicago, Ill.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
J. C. Haile & Sons, Motion Picture Department, 215 Walnut St., Cincinnati, Ohio.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Hathen Productions, 1239 Summer St., Philadelphia, Pa.

Louis H. Hill, 314 SW. Ninth Ave., Portland, Oreg.
Hollywood Camera Exchange, 1600 Cahuenga Blvd., Los Angeles, Calif.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Institutional Cinemaservice, Inc., 1560 Broadway, New York, N. Y.
International Research Corporation, 140 Fourth Ave., Ann Arbor, Mich.
Iver Johnson Sport Goods Co., 155 Washington St., Boston, Mass.
Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kelly Studios, 14 E. 10th St., Erie, Pa.
Keystone Mfg. Co., 288 A St., Boston, Mass.
Kunz Motion Picture Service, Inc., 1319 Vine St., Philadelphia, Pa.
Lee Film Company, 716 E. Elmira St., San Antonio, Tex.
E. Leitz, Inc., 60 E. 10th St., New York, N. Y.
Manse Film Library, 1521 Dana Ave., Cincinnati, Ohio.
Metropolitan Motion Picture Co., 50 Branford Pl., Newark, N. J.
Metropolitan Motion Picture Co., Fisher Bldg., Detroit, Mich.
Michigan Film Library, 15745 Rosemont Road, Detroit, Mich.
Modern Sound Pictures, Inc., 1219 Farnum St., Omaha, Nebr.
Mogull's, Inc., 68 W. 48th St., New York, N. Y.
R. F. Mortimer, 103 W. 4th St., Plainfield, N. J.
Motion Picture Service, 5514 University Way, Seattle, Wash.
R. C. Mulnix Sound Systems, 310 15th St., Denver, Colo.
Murray Motion Picture Service Co., 640 Reibold Bldg., Dayton, Ohio.
National Camera Exchange, 5 S. 5th St., Minneapolis, Minn.
National Motion Picture Service, 236 W. 55th St., New York, N. Y.
Paramount Mfg. Co., P. O. Box 224, Back Bay Station, Boston, Mass.
Pathescope Co. of the Northeast, 438 Stuart St., Boston, Mass.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Pratt Sound Film Service, Cedar Rapids, Iowa.
Ramsey Pictures, Ramsey Tower, Oklahoma City, Okla.
Reagan Visual Education Co., Rhodes Bldg., Atlanta, Ga.
J. C. Reiss, 10 Hill St., Newark, N. J.
Rolab Photo-Science Laboratories, Sandy Hook, Conn.
Frank L. Rouser Co., 317 W. Church Ave., Knoxville, Tenn.
Ruby Camera Exchange, Inc., 729 Seventh Ave., New York, N. Y.
Scioto Movie Supply, P. O. Box 134, Portsmouth, Ohio.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
Society for Visual Education, Inc., 100 E. Ohio St., Chicago, Ill.
S. O. S. Cinema Supply Corp., 636 Eleventh Ave., New York, N. Y.
Spindler & Sauppe, Inc., 86 Third St., San Francisco, Calif.
J. M. Stackhouse, Lake Junaluska, N. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
D. A. Stewart, Motion Pictures, P. O. Box 396, Mount Vernon, N. Y.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Texas Visual Education Co., 305 W. 10th St., Austin, Tex.
E. B. Thompson, 2037 K St., N.W., Washington, D. C.
Howard E. Thompson, Mount Airy, Md.
United Projector Film Co., 228 Franklin St., Buffalo, N. Y.
Universal Camera Corp., Chicago, Illinois
Victor Animatograph Corp., Davenport, Iowa.
Vogan Engineering Sales, 9236 S. Elizabeth St., Chicago, Ill.

W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Westcott, Slade & Balcom, 95 Empire St., Providence, R. I.
Western Movie Supply Co., 254 Sutter St., San Francisco, Calif.
Westing Photo Service, 501 Euclid, Des Moines, Iowa.
David White Co., Milwaukee, Wis.
Wholesome Films Service, Inc., 48 Melrose St., Boston, Mass.
Williams, Brown, & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Willoughby Camera Stores, Inc., 110 W. 32d St., New York, N. Y.

Equipment and Supplies for Making Slides

J. F. Adams, Inc., 459 Washington St., Buffalo, N. Y.
Andlauer Film Co., Ozark Bldg., Kansas City, Mo.
Bond Slide Co., 68 W. Washington St., Chicago, Ill.
Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Bransby & Hewitt, 1600 Broadway, New York, N. Y.
Camera Shoppe, 1920 North Broadway, Oklahoma City, Okla.
Camera Supply Co., 1515 N. Cahuenga Blvd., Hollywood, Calif.
Capitol Theatre Supply Co., 28 Piedmont St., Boston, Mass.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Craftsmen Photo Co., Inc., 245 W. 55th St., New York, N. Y.
D. T. Davis Co., 1600 S. Limestone St., Lexington, Ky.
H. O. Davis, 522 Broadway, Oklahoma City, Okla.
Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Des Moines Slide Co., Des Moines, Iowa.
Eastman Kodak Stores, Inc., Kodascope Libraries Division, 356 Madison Ave. at 45th St., New York, N. Y.
Educational Equipment Co., 1909 Commerce St., Dallas, Tex.
EMF Camera Exchange, 428 Massachusetts Ave., Cambridge, Mass.
Erker Bros. Optical Co., 610 Olive St., St. Louis, Mo.
Ewing Galloway, 420 Lexington Ave., New York, N. Y.
Jasper Ewing & Sons, 225 Main St., Baton Rouge, La., and 627 Carondelet St., New Orleans, La.
Eye Gate House, Inc., 330 W. 42d St., New York, N. Y.
Felt Letter Studios, 538 S. Wells St., Chicago, Ill.
Film Bookings, 716 Federal St., Troy, N. Y.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
G. Gennert, 20 W. 22d St., New York, N. Y.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
J. C. Haile & Sons, Motion Picture Department, 215 Walnut St., Cincinnati, Ohio.
Harcam Photo Supply Shop, 218 Baronne St., New Orleans, La.
Harfilms, Inc., 600 Baronne St., New Orleans, La.
Hathen Productions, 1239 Summer St., Philadelphia, Pa.
Louis H. Hill, 314 SW. Ninth Ave., Portland, Ore.
Hollywood Camera Exchange, 1600 Cahuenga Blvd., Los Angeles, Calif.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Home Movies Studio, Inc., 2019 Euclid Ave., Cleveland, Ohio.
Huber Art Co., 124 W. 7th St., Cincinnati, Ohio.
Ideal Pictures Corp., 28-34 E. 8th St., Chicago, Ill.
International Research Corp., 140 Fourth Ave., Ann Arbor, Mich.

Iver Johnson Sport Goods Co., 155 Washington St., Boston, Mass.
Jordan Productions, 1140 Liberty St., Franklin, Pa.
Kelly Studios, 14 E. 10th St., Erie, Pa.
Keystone Mfg. Co., 288 A St., Boston, Mass.
Keystone View Company, Meadville, Pa.
Lee Film Co., 716 E. Elmira St., San Antonio, Tex.
E. Leitz, Inc., 60 E. 10th St., New York, N. Y.
Metropolitan Motion Picture Co., Fisher Bldg., Detroit, Mich.
Michigan Film Library, 15745 Rosemont Road, Detroit, Mich.
Mitten's Display Letters, Redlands, Calif.
Modern Sound Pictures, Inc., 1219 Farnum St., Omaha, Nebr.
R. F. Mortimer, 103 W. 4th St., Plainfield, N. J.
Moviola Co., 1451 Gordon St., Hollywood, Calif.
National Camera Exchange, 5 S. 5th St., Minneapolis, Minn.
National Motion Picture Service, 236 W. 55th St., New York, N. Y.
National Studios, 145 W. 45th St., New York, N. Y.
Pathescope Co. of the Northeast, 438 Stuart St., Boston, Mass.
Photoart House, 844 N. Plankinton Ave., Milwaukee, Wis.
Quality Slide Co., 6 E. Lake St., Chicago, Ill.
J. C. Reiss, 10 Hill St., Newark, N. J.
Frank L. Rouser Co., 317 W. Church Ave., Knoxville, Tenn.
Ruby Camera Exchange, Inc., 729 Seventh Ave., New York, N. Y.
S. O. S. Cinema Supply Corp., 636 Eleventh Ave., New York, N. Y.
Sillcocks-Miller Co., 10 Parker Ave., W., South Orange, N. J.
Sioux City Camera Shop, 711 Pierce St., Sioux City, Iowa.
J. M. Stackhouse, Lake Junaluska, N. C.
Stark-Films, Howard and Centre Sts., Baltimore, Md.
Starkweather & Williams, Inc., 160 Westminster St., Providence, R. I.
Stillfilm, Inc., 4703-4705 W. Pico Blvd., Los Angeles, Calif.
Texas Visual Education Co., 305 W. 10th St., Austin, Tex.
E. B. Thompson, 2037 K St., Washington, D. C.
Howard E. Thompson, Mount Airy, Md.
United Projector Film Corp., 228 Franklin St., Buffalo, N .Y.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Westcott, Slade, & Balcom, 95 Empire St., Providence, R. I.
Western Movie Supply Co., 254 Sutter St., San Francisco, Calif.
Westing Photo Service, 501 Euclid, Des Moines, Iowa.
Williams, Brown & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Willoughby Camera Stores, Inc., 110 W. 32d St., New York, N. Y.

Charts, Graphs, and Diagrams

American Bemberg Corporation, 261 Fifth Ave., New York, N. Y.
Art Education, Inc., 35 W. 34th St., New York, N. Y.
Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Milton Bradley Co., New Brunswick, N. J.
A. Bruderhausen, 122 Ridgewood Ave., Yonkers, N. Y.
Campbell Photo Service, Inc., 917 F St. N.W., Washington, D. C.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Clay-Adams Co., Inc., 44 E. 23d St., New York, N. Y.
Corn Industries Research Foundation, 270 Broadway, New York, N. Y.
George F. Cram Co., Inc., 730 E. Washington Street, Indianapolis, Ind.

Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
General Biological Supply House, Inc., 761 E. 69th Pl., Chicago, Ill.
Globe Book Co., Inc., 175 Fifth Ave., New York, N. Y.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
Grolier Society, Inc., 2 W. 45th St., New York, N. Y.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
McConnell School Map Co., 610 E. Madison St., Goshen, Ind.
North American Rayon Corp., Educational Division, 261 Fifth Ave., New York, N. Y.
A. J. Nystrom & Co., 3333 Elston Ave., Chicago, Ill.
Pictorial Statistics, Inc., 142 Lexington Ave., New York, N. Y.
Rand McNally Co., 536 S. Clark St., Chicago, Ill.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Ward's Natural Science Establishment, Inc., Rochester, N. Y.
W. M. Welch Manufacturing Co., 1515 Sedgwick St., Chicago, Ill.
Yoder Instruments, East Palestine, Ohio.

Maps and Supplies

Abrams Aerial Survey Corp., 606 E. Shiawassee St., Lansing, Mich.
American Map Co., Inc., 16 E. 42d St., New York, N. Y.
Edward E. Babb & Co., Inc., Boston, Mass., and Philadelphia Pa.
R. R. Bowker Co., 62 W. 45th St., New York, N. Y.
Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Milton Bradley Co., New Brunswick, N. J.
Campbell Photo Service, Inc., 917 F St. N.W., Washington, D. C.
Charles W. Clark Co., 240 Madison Ave., New York, N. Y.
Edith M. Cook Projects, Westtown, Pa.
George F. Cram Co., Inc., 730 E. Washington St., Indianapolis, Ind.
Dennoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Deseret Book Co., 44 East on South Temple St., Salt Lake City, Utah.
Fairchild Aerial Surveys, Inc., 224 E. 11th St., Los Angeles, Calif.
Friendship Press, 156 Fifth Ave., New York, N. Y.
L. F. Gates, Syracuse, N. Y.
Greyhound Travel Bureau, 920 Superior Ave., Cleveland, Ohio.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
C. Eleanor Hall, 45 Spring St., Port Henry, N. Y.
C. S. Hammond & Co., 440 Fourth Ave., New York, N. Y.
Home Movie Sales Agency, 259 S. Corona St., Denver, Colo.
Industrial Arts Cooperative Service, Inc., 519 W. 121st St., New York, N Y.
International News Photos, 235 E. 45th St., New York, N. Y.
Keystone View Co., Meadville, Pa.
J. S. Latta & Son, Cedar Falls, Iowa.
McConnell School Map Co., 610 E. Madison St., Goshen, Ind.
McKinley Publishing Co., 1021 Filbert St., Philadelphia, Pa.
A. J. Nystrom & Co., 3333 Elston Ave., Chicago, Ill.
Pan American Airways System, 135 E. 42d St., New York, N. Y.
Pictorial Statistics, Inc., 142 Lexington Ave., New York, N. Y.
Practical Drawing Co., Dallas, Tex.
Rand McNally Co., 536 S. Clark St., Chicago, Ill.
Karl Smith, Cartographer, 1242 Cherokee Road, Louisville, Ky.
Universal Distributing Co., 38 Union Square, New York, N. Y.

Objects, Specimens, and Models

Stanley Bowman Co., 2929 Broadway, New York, N. Y.
Milton Bradley Co., New Brunswick, N. J.
A. Bruderhauser, 122 Ridgewood Ave., Yonkers, N. Y.
Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill.
Clay-Adams Co., Inc., 44 E. 23d St., New York, N. Y.
Edith M. Cook Projects, Westtown, Pa.
Craft Guild, 1628 Drummond Pl., Chicago, Ill.
Denoyer-Geppart Co., 5235 N. Ravenswood Ave., Chicago, Ill.
Duhem Motion Picture Mfg. Co., 135 Hayes St., San Francisco, Calif.
General Biological Supply House, Inc., 751 E. 69th Pl., Chicago, Ill.
A. J. Griner Co., 417 E. 13th St., Kansas City, Mo.
M. J. Hofmann, 989 Gates Ave., Brooklyn, N. Y.
Howard Engine and Mfg. Co., 2417 N. Ashland Ave., Chicago, Ill.
Industrial Arts Cooperative Service, Inc., 519 W. 121st St., New York, N. Y.
Rolab Photo-Science Laboratories, Sandy Hook, Conn.
Selley Mfg. Co., Inc., 1377 Gates Ave., Brooklyn, N. Y.
C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
Veragraph Film Corp., 145 W. 45th St., New York, N. Y.
Ward's Natural Science Establishment, Inc., Rochester, N. Y.
W. M. Welch Mfg. Co., 1515 Sedgwick St., Chicago, Ill.
Yoder Instruments, East Palestine, Ohio.

Projection Screens

American Optical Company, Buffalo, N. Y.
Bausch & Lomb Optical Company, Rochester, N. Y.
Bell & Howell Company, 1801 Larchmont Ave., Chicago, Ill.
Crystal Movie Screen Corporation, Celina, Ohio.
Da-Lite Screen Company, Inc., 2723 N. Pulaski Road, Chicago, Ill.
De Vry, Inc., 1111 W. Armitage Ave., Chicago, Ill.
Eastman Kodak Company, Rochester, N. Y.
Keystone View Company, Meadville, Pa.
National Theatre Supply Company, 90 Gold St., New York, N. Y.
Raven Screen Corporation, 145 E. 24th St., New York, N. Y.
R. C. A. Manufacturing Company, Inc., Educational Department, Camden, N. J.
Society for Visual Education, Inc., 100 E. Ohio St., Chicago, Ill.
Trans-Lux Daylight Picture Screen Corporation, 1270 Sixth Ave., New York, N. Y.
Victor Animatograph Corporation, Davenport, Iowa.
Williams, Brown and Earle, Inc., 918 Chestnut St., Philadelphia, Pa.
Willoughby Camera Stores, Inc., 110 W. 32nd St., New York, N. Y.

Exposure Meters

DeJur-Amsco Corporation, Long Island City, N. Y.
General Electric Company, Schenectady, N. Y.
G-M Laboratories, Inc., 4272 N. Knox Ave., Chicago, Ill.
Hickok Electrical Instrument Company, 10581 Dupont Ave., Cleveland. Ohio.
Western Electrical Instrument Corporation, Newark, N. J.

Television Equipment and Supplies

Columbia Broadcasting System, Inc., New York, N. Y.
Don Lee Broadcasting System, Inc., Hollywood, Calif.
Allen B. DuMont Laboratories, Inc., New York, N. Y.
General Electric Company, Schenectady, N. Y.
National Broadcasting System, Inc., New York, N. Y.
Philco Radio & Television Corp., Philadelphia, Pa.
Radio Corporation of America, Camden, N. J.
Zenith Radio Corporation, Chicago, Ill.

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